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PROGRESSIVE MEDICINE

A QUARTERLY DIGEST OF ADVANCES, DISCOVERIES
AND IMPROVEMENTS

IN THE

MEDICAL AND SURGICAL SCIENCES

EDITED BY

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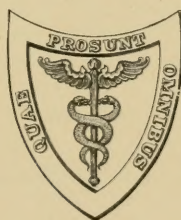
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VOLUME III. SEPTEMBER, 1912

DISEASES OF THE THORAX AND ITS VISCERA, INCLUDING THE HEART, LUNGS,
AND BLOODVESSELS—DERMATOLOGY AND SYPHILIS—OBSTETRICS—
DISEASES OF THE NERVOUS SYSTEM.



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PROGRESSIVE MEDICINE

SEPTEMBER, 1912

DISEASES OF THE THORAX AND ITS VISCERA, INCLUDING THE HEART, LUNGS, AND BLOODVESSELS

By WILLIAM EWART, M.D., F.R.C.P.

TUBERCULOSIS AND ITS TREATMENT

The Relative Incidence of Human and of Bovine Tuberculosis in Man.
If we are to trust the latest statistical evidence, an important stage has been reached on the way to a final settlement of this all-important question. Such is the deliberate opinion expressed in an editorial of the *Journal of the American Medical Association* (February 17, 1912), which perceives a hopeful sign in the agreement among investigators from opposite ends of the world; and makes the following statements: "The evidence is conclusive that, so far as ordinary phthisis is concerned, bacilli of bovine origin are so rarely concerned as to be of little significance. Of 709 cases in which the type of bacillus present in the sputum was studied in a way to assure the value of the results (305 of these being American, 152 Japanese, and the rest European cases) the compilation of Kossel¹ shows that in only two was the bovine form responsible for the condition. Both of these were English cases, and were so carefully investigated that the results seem reliable. There is also one other probable case of bovine type infection, and one case in which both human and bovine type occurred together, leaving 705 cases of pulmonary tuberculosis in which only the human type of organism was present. In other words, if the same ratio exists elsewhere, only about 1 in 200 cases of pulmonary tuberculosis is of bovine origin."

Surgical tuberculosis tells a very different tale, and not alone *in*

¹ Deutsch. med. Woch., 1911, xxxvii, 1972.

infants and children. In them, the bovine share in the total mortality from tuberculosis rises to from 6 to 10 per cent., according to the statistical observations of Park and Krumwiédé,¹ who find that the glandular and abdominal tuberculosis of children is more of the bovine than of the human type. *In adults* these observers find the relative frequency of the bovine tubercle bacillus to be for cervical adenitis, 3.6 per cent.; for abdominal tuberculosis, 22 per cent.; for bone and joint tuberculosis, 3.5 per cent. In lupus, the British Royal Commission found a type of bacilli so different from the standard bovine and human types that its origin could not usually be determined. According to Burekhardt, those cases of joint tuberculosis in which there is a long history of infection and practically no bone involvement are likely to be of bovine origin.

These facts speak for themselves. The circumstance that pulmonary tuberculosis is nearly without exception of human derivation does not detract from the extent of damage and suffering traceable to bovine tuberculosis and presumably to milk infection.

Bovine Tuberculosis. This is the central point in the practical conclusions arrived at by the Royal Commission. (1) The *human* bacillus, even when administered in large doses, produces only slight and non-progressive lesions in cattle, goats, and pigs. (2) It is only exceptionally contained in goat's or cow's milk, namely, when the dose of human tuberculous material is so large that the bacillus escapes into the blood stream of the animal, and reaches the milk sinus. (3) As to the bovine bacillus, only rarely does a pulmonary lesion in adult man yield this bacillus, but in cases of abdominal tuberculosis in children, about 50 per cent. showed the bovine bacillus and that type alone. (4) Bovine tubercle bacilli are apt to be abundantly present in milk where there is tuberculous disease of the udder; but they also occur in cows presenting no evidence whatever of disease of the udder *in vivo* or post mortem. (5) Lastly, as milk may be easily infected by contamination with the feces or other discharges of such animals, stronger measures are needed for the prevention of ingestion of living bovine tubercle bacilli by man, and especially by children.

The Report of the Royal Commission on Tuberculosis for the Province of Quebec gives a most clear and practical procedure for the prevention and eradication of tuberculosis. It divides the measures to be taken into two groups: *Those which can be carried out at once, and those which can be carried out gradually.* Among the first are stricter observance of the public health laws, education of the general public regarding tuberculosis, teaching of the principles of hygiene in schools, medical inspection of schools and workshops, the establishment of tuberculosis dispensaries, isolation hospitals for advanced cases, and open-air schools;

¹ Journal of Medical Research, 1911, xxv, 313.

and legislative enactments regarding alcoholism, premature employment of children, inspection of milk, etc. Among measures to be carried out gradually are the creation of sanatoriums, farm colonies, and holiday colonies, and legislation to enforce the building of cheap and healthy houses for the working classes, and general improvement of hygienic conditions throughout the province. The report submits excellent practical recommendations to the Lieutenant-Governor in Councils to the part the Government should take in the tuberculosis campaign.

The International Congress at Rome afforded full scope for divergent views. The following resolutions were unanimously adopted by a selected Committee (1) Prophylaxis of tuberculosis must principally be directed against the suppression of contamination from man to man, and principally in the family, and (2) the contamination of man by bovine infection is of less frequency; nevertheless, it is necessary to maintain all measures against infection of bovine origin.

As regards specific treatment, we know that, in a great many cases, the disease appears to be arrested with very little interference on our part, every new or old specific must therefore be received with due reservation.

The Tuberculin Treatment is too large a subject to attempt in these pages. Its latest discussion, at Rome, testified to its genuine usefulness, as well as to its many unsolved problems. Its best friends are those who realize the wisdom of moderation in urging its claims, such as instanced in Arthur Latham's¹ address. Meanwhile, Wolff-Eisner had given us a masterly review of its theoretical basis and the practical results, and pointed out *two advantages* it possesses over the self treatment of the organism: (1) The better opportunity to regulate the dose, and (2) the possibility of producing antibodies in places in which the vitality is reduced, and this is important. His² further conclusions are that: (1) Acting similarly to the reabsorbed products from foci, it may be regarded as the virus of the bacilli. (2) The different tuberculins are "consubstantial," their effects varying in "degree." (3) Tuberculin is an albumin poison, of the character of endotoxin, it is not a toxin; no neutralizing antitoxin is formed by the action of tuberculin, but antibodies, lysin; the disclosure of the non-poisonous tuberculin takes place along the line of bacteriolysis, antigen + amboceptor + complement; the tuberculin reaction is closely joined to the presence of the antibodies. (4) The non-appearance of the tuberculin reaction does not depend on the formation or presence of antitoxins, but probably on the union of the injected tuberculin with receptors formed locally after the injection. (5) Treatment should begin with small doses, and great reaction should be avoided. (6) That form of therapy seems to be preferable in which all clinical signs of reaction are

¹ Berlin. klin. Woch., July, 1911.

² Cf. New York Medical Journal.

avoided, although both theoretical and practical results may be obtained by methods productive of reaction. (7) With a therapy in which no reaction occurs, no harm can be done. (8) The therapy without reaction is the only one suitable for ambulant practice. (9) The individual tuberculin should be titrated at intervals of four weeks in order to maintain the reactionless therapy. The dose which produces a weak puncture reaction does not produce clinical reaction and yet is not inefficient. (10) In fever patients, the therapeutical injections are to be made intracutaneously, so far as possible. (11) Mixed tuberculin, combining the old and the new tuberculin, is to be recommended for both theoretical and practical reasons, and should be likewise absolutely without reaction. (12) This is supported by the vaccination therapy. Its polyvalent mixed vaccines, consisting of streptococci, staphylococci, and pneumococci, furnish a practical opportunity for combating and preventing the dreaded mixed infections.

THE ORAL METHOD of administering T. R., according to Latham's practice, in horse serum preferably in the morning on an empty stomach, has received strong support from S. Solis Cohen¹ from the clinical standpoint of result. It is, however, strongly attacked by B. Möller and W. Heinemann² as being as futile as it is harmless, on the showing of their extensive researches on the digestibility of the material, and on the failure of enormous doses of it to produce an immunity recognizable by the approved tests. Neither have they found even any focal reaction nor depression and headache, such as result from its subcutaneous use. The subjective benefit and the gain in weight are otherwise to be explained.

The British National Insurance Act Sanatorium Benefit. The Departmental Committee on Tuberculosis appointed by the Treasury on February 22, 1912, with Waldorf Astor, M.P., as its Chairman, issued, on April 30, its interim report. Its principal recommendations may be summarized as follows: (1) That schemes dealing with the whole population should be drawn up by councils of counties and county boroughs with regard to the incidence of the disease and the special conditions and circumstances of the area. (2) That an adequate number of tuberculosis dispensaries is essential. (3) That, so far as possible, grants in aid of the dispensaries should only be given where such institutions will eventually form constituent parts of complete schemes. (4) That in framing complete schemes, regard should be had to avoiding waste by overlapping and to obtaining coöperation. (5) Further securing the coöperation of medical practitioners for the early detection of the disease and its domiciliary and dispensary treatment. (6) To securing suitable and experienced practitioners for the senior appoint-

¹ New York Medical Journal, January 20, 1912.

² Deutsche. med. Woch., October 5, 1911.

ments in connection with the institutions established. (7) That local authorities should avoid pretensions and extravagant buildings, and provide institutions of a simple and inexpensive character, with due regard to any town-planning schemes. (8) That inasmuch as the opportunities now afforded in general hospitals to students for the observation and treatment of tuberculosis are insufficient to secure provision of an adequate number of expert medical officers, advantage should be taken of the extended opportunities which will be afforded under the proposed scheme to obtain additional instruction.

It is estimated that approximately 250 or 300 tuberculosis dispensaries, 9000 beds in sanatoriums, 9000 hospital beds for the purposes of observation, treatment, education, and isolation, and eventually beds for the treatment of children and for non-pulmonary tuberculosis both in children and in adults will be required, it is evident that the whole complex piece of machinery cannot be got into full working in a hurry. The proposals would seem to be an endorsement in principle, and largely in detail, of what is widely known as the Edinburgh coördinated scheme, with a definite recognition of the need for the systematic coöperation of general practitioners as an essential part of the scheme.

The Path of Infection into the Lungs. The *Journal of the American Medical Association* (June 24, 1911) notes that in a report made to the Philosophical Society, Cambridge, England, on experiments as to the entry of bacteria into the lungs, Drs. Cobbett and Graham-Smith¹ announce that if *B. prodigiosus* were placed in the mouths of very young guinea-pigs it could be detected in the lungs examined a few minutes later. They assume that this affords an explanation for tuberculosis in animals fed with tubercle bacilli in many experiments, and invalidates certain conclusions which have been advanced as to the usual path of infection in this disease.

The Virulence and Contagiousness of the Perspiration in Tuberculosis has been demonstrated by Professor Poncet and by Piéry,² the former having long insisted upon the septicity of the perspiration of the hands in connection with operative surgery. Piéry finds a virulence in 30.76 per cent. of cases, and that in 41.66 per cent. this may be a vehicle for bacilli.

This brings home to us the responsibility of our thoughtlessness regarding "Books and Bacteria," and of the lamentable failure of our public health authority to safeguard our food and particularly the ubiquitous loaf from the risks of the road, and from the much greater risks from "promiscuous handling" in the house.

Pleurisy and Life Assurance. H. Allard and H. Köster³ report in *Hygiea* that in 2123 cases of tuberculosis investigated for a previous

¹ Abstract in *Nature*, March 16.

² *Acad. de Méd.*, March 26, 1912.

³ Cf. *Journal of the American Medical Association*, 1912. p. 1955.

history of pleurisy, the total number of cases of pleurisy with effusion was 514; without effusion 57; rheumatic pleurisy 46; and nephritic and typhoid pleurisy in 12 and 4. The data confirm the assumption that in at least half the cases tuberculosis may be counted on to follow within five years as a rule. "But in this respect the young are better off. Under the age of fifteen years, tuberculosis follows much more rarely, and the course is much less severe and slower than in persons over thirty years. On the other hand, when the pleurisy develops as a complication of an acute infectious disease or other non-tuberculous affection, tuberculosis follows only exceptionally. An idiopathic pleurisy should therefore be regarded as an extra risk and acceptance of the candidate be postponed for at least five years, but pleurisy as a complication of acute infection need not be considered in estimating the risk."

Tubercle in the Heart. R. Pellegrini¹ gives instances of its endocardial and valvular site. He has found records of 120 cases of tuberculosis, confirmed by bacillary examination in 53 cases.

The Blood in Tuberculosis is shown by Wright and King's² elaborate study to afford valuable prognostic indications. A positive improvement is declared by (a) decreasing white count; (b) falling polymorphonuclear percentage; (c) rising hemolytic index; (d) rising lymphocyte percentage.

These are practically the same conclusions as those arrived at by M. Solis-Cohen and Albert Strickler³ as to "the effect of tuberculin treatment upon the leukocytic picture."

The Diazo Reaction Method (as a test for the urochrom and urochromogen which give rise to it in the urine) is strongly recommended by M. Weisz⁴ as a most sensitive and reliable index of the progress of pulmonary tuberculosis and of the indications for tuberculin. Artificial pneumothorax is shown to take a most rapid and striking effect upon that general toxemia which the "diazo" reveals. But he has never seen a cure from tuberculin when the disease had advanced to the stage of "positive diazo."

The Hemoptysis of Diagnosis and the Hemoptysis of Prognosis. This picturesque description of the well-known difference in the significance of the early and of the late hemorrhage is suggested by *Hemoptysis in Pulmonary Tuberculosis* (Mariano P. Florez Estrada).⁵ The first is due to the initial hyperemia and reaction of the tissues which follow the first implantation of Koch's bacillus. The second is caused by the rupture of the aneurysms of Ramussen on the walls of cavities. They

¹ Policlinic, January 21, 1912.

² American Journal of the Medical Sciences, June, 1911.

³ New York Medical Journal, January 13, 1912.

⁴ Münch. med. Woch., June 20, 1911.

⁵ Revista de Med. y Cir. Pract., July 14, 1911.

are respectively the end of the beginning, apt to be intractable, and frequently a direct cause of death, a sign that the tubercular process has arrived, and the beginning of the end. There are other cases of hemoptysis which cannot be placed in either of these categories, as for instance the case in a boy, aged sixteen years, in whom the expectoration gradually reached a condition of almost constant profuse hemoptysis. The profound anemia favored the rapid development of the disease and led to early death.

Bleeding in Phthisis. Piéry and Rothem,¹ who have also traced the earliest idea of Forlanini's operation to Carson (1822) and to Ramadge (1824), refer, in their *Nineteenth Century Phthisiotherapy*, to the long forgotten employment of bleeding in consumption. Broussais used it freely "against the phlogosis," but Louis and others only for any painful symptoms.

The Immediate Sanatorium Results. According to J. A. D. Radcliffe,² simple sanatorium treatment clears bacilli from the sputum in 20 to 25 per cent. of cases; but when tuberculin treatment is added, in 50 per cent. The conclusion is obvious.

The Remote Results of Tuberculin. Joaquerd's³ 46 courses of "old tuberculin" have resulted in 24 cures (of six to seven years' duration in 20 of them), 9 improvements, 6 negative, and 10 unfavorable results. It is "superfluous" in the first stage, but "excellent" in the chronic torpid and afebrile cases.

Incidentally we note that J. M. H. Munro, of Bristol, reports a case of *Addison's disease* successfully treated by tuberculin.

Spengler's I. K. gets a very unfavorable report from Baer⁴ in the 10 cases he treated with it.

The New Light on Vaccination for Tuberculosis which is held up by A. Calmette⁵ is that, as in 81 per cent. of cases the invasion occurs before the age of fifteen years, we might well undertake a general protective inoculation. Resistance persists only in the carriers of some tubercular lesion. To confer immunity, dead bacilli and those of birds and cold-blooded animals are useless. He hopes to find a method of inoculation *via* the stomach for use during the first weeks of life; already he has obtained in animals a remarkable resistance after macroscopic lesions set up in them by a bovine bacillus the waxy envelope of which had been modified by successive cultures on glycerinated ox bile; but the reaction to inoculation is febrile and almost of a typhoid complexion.

The Continuous Inhalation Treatment introduced by David Lees is the subject of further favorable reports from him and from a few

¹ Rev. de Méd., December, 1911.

² Lancet, March 23, 1912.

³ R. Méd. Suisse R., January, 1912.

⁴ Cf. Journal of the American Medical Association, 1912, p. 741.

⁵ Presse Méd., February 21, 1912.

adherents, but has not made much headway in general or sanatorium practice.

Various New Remedies have cropped up which are still on trial. Meanwhile, Odell, of Torquay, renews his advocacy of *ichthyol*.

Iodoform orally, intramuscularly, and best "intravenously" is extolled by W. M. Crofton¹ in injections (2 to 5 times a week) of $\frac{1}{4}$ to 1 grain dissolved in ether with a little liquid paraffin. The iodine converts "toxin" into "toxoid," and stimulates antitoxin formation, with remarkable results.

CHEST PERCUSSION AND AUSCULTATION

Bimanual Palpatory Percussion. H. Sewall² presents us with a new edition of Robert Maguire's ambitious method, with a special bimanual refinement. Its principle is the same as that of auscultatory percussion; only the vibrations are tactile, and received by the palpating fingers of the other hand instead of by the ear. It would be doubtless valuable to the expert, and an excellent training for the student.

Immediate Percussion. An anonymous contributor³ informs us that Obratzov, of Kieff, now confines himself to this method, after finding it to be his best and only means of demarcation between stomach and intestine in most of his abdominal examinations. In the thorax it does not answer for the apex, but excellently for pleural effusion and for the heart. But he also uses the left hand to exert the necessary pressure and to smooth the cutaneous surface for percussion.

The "Pleximeter and Hammer-Drop" Percussion Method. Otto Lerch,⁴ of New Orleans, has followed up his previous paper on percussion of the kidneys with a short article on his⁵ new method of percussion. The percussing force is not a hammer stroke, but a hammer drop impact. Its strength varies not with the muscular effort, for none is used except to swing the hammer upward, but with its weight and with the vertical distance through which it is allowed to fall. It is therefore a definite and constant quantity for each height of drop. Many years ago I constructed, for the same purpose of adjustable uniformity in the strength of the percussion, a very simple plessor consisting of a short piece of thick brass rod moving within a small wooden cylinder and working on the catapult principle under the tension of a spring situated above it. When I mentioned the matter to my lamented friend John West Roosevelt, in 1892, he did me the kindness of obtaining for me from his engineer cousin a more elaborate apparatus, and this

¹ British Medical Journal, February, 1910.

² Arch. of Diag., 1912, No. 1.

³ Sem. Méd., February 28, 1912.

⁴ Medical Record, February 4, 1911.

⁵ New York Medical Journal, December 30, p. 1332.

was on the striking hammer principle, instead of the dropping hammer principle. But in both these models there was a driving force other than simple gravitation, while Lerch utilizes the simple fall of the hammer. He uses a hammer with a heavy steel head, a soft black rubber tip, light ebony handle, and a thin ivory pleximeter.

THE TECHNIQUE. The pleximeter is placed upon the portion of the body to be percussed; with a light movement of the wrist the hammer is lightly tossed up, and the hammer head allowed to drop upon the pleximeter by its own weight. By this method the kidneys can be percussed with the greatest ease and accuracy, and the results confirmed on the cadaver. He¹ can even identify the persistence of the remains of the thymus, and its occasional "enlargement associated with nervous symptoms and often with enteroptosis and functional insanity." It is, of course, well known that Piorry professed to percuss the kidneys, and I have long taught their accurate dorsal percussion as well as that of the heart, spleen, liver, and pancreas by means of Sansom's pleximeter and the finger as a percussor, a method which is eminently palpatory as well as acoustic. To proceed with Lerch's own description, as soon as the dropping hammer touches the pleximeter vibrations are felt in the palm of the hand and the finger tips, changing in character with the slightest change in the area percussed. A 1 inch drop, or a drop of several inches, is the same in everybody's hands, and it does not matter whether the lean man or the fat man, the nervous or the calm practices it, he will not differ in results as long as he allows the hammer to drop on the pleximeter. As soon as the border of a solid organ is reached, the hammer feels heavy when the organ is located near the surface, light when the organ is deeply located and air intervenes between it and the body surface. This sensation varies according to the amount of air beneath. At the same time, the rebound of the hammer varies proportionately in height and frequency; there is practically no rebound when a solid organ is in contact with the surface. Finally, perceptibly later, the changing note is heard, a dull thud, directly over the solid organ. These three criteria—the vibrations felt, the rebound of the hammer seen, and the note heard—allow even those who do not possess an acute sense of hearing to obtain the same results as those who have; as the eye and sense of touch, active all at the same time, make up for any deficiency of hearing. He adds; "Although the method I employ uses the means of the old percussion—that is hammer and pleximeter, it has nothing in common with it, the older method depending on stroke and sound, mine on the drop, using touch, sight, and hearing to form the judgment. The former is difficult to learn and gives results only in the hands of skilled observers, and even then is far inferior. My method is easy to learn and gives exact

¹ Cf. Medical Record, March 6, 1909.

and most delicate results in the hands of the very beginner. In the former method, the personal factor is of great importance and results constantly vary. One will consider a stroke strong, whereas another will consider it light, and one will hear a difference in sound when another is far from perceiving any difference at all. The drop percussion method excludes all personal equations, and gives uniform results in the hands of all. The drop is always the same, and the result controlled by touch, sight, and hearing. It is entirely different from any other percussion method now in use, superior in its simplicity and easy acquisition, and its far greater delicacy and accuracy."

A "**Bedpan**" **Chestpiece**, for convenient dorsal auscultation, particularly in pneumonia, without any disturbance to the patient, was long ago invented by my lamented friend Andrew H. Smith,¹ of New York. Similar advantages were claimed in 1907 by W. B. Colquhoun, for his chestpiece; and more recently also by L. M. Routh.² The former is constructed on the phonophore principle, which allows examination through the clothes, and the ear pieces are self-retaining without any metal springs.

Oral Auscultation is an old method redescribed by Koan Takata.³ The examiner's stethoscope is held in front of the mouth, while the patient breathes exclusively through the mouth, slowly and deeply. It is advisable sometimes to close the nares with cotton, and there must be absolute quiet in the room. The endothoracic rales, which in this form of examination will always be metallic, seem to be louder than the rales heard by pectoral auscultation, and their number may be sometimes larger.

Pulmonary Physical Signs. **LAGGING OF THE CHEST WALL** is a most important sign studied by F. M. Pottenger⁴ in several hundred examinations. Lagging is not confined to the apex of the lung, but apt to involve the entire side by diminished motion of the diaphragm in early tuberculosis, and in many cases of chronic pulmonary disease. In some cases, however, the respiratory motion seems to be fully regained. In chronic or quiescent pulmonary involvement of one lung and slight active lesion in the other, often the lagging will be greater on the side of the fresher lesion, though the lesion be small in extent. Inflammations of the pleura, especially the acute, and particularly if situated at the base of the lung, produce the same lagging as do intrapulmonary lesions.

A **NEW SIGN OF GASTRIC ULCER OR OF CARCINOMA** has been localized in both second intercostal spaces by E. Zugsmith,⁵ as a slight circumscribed dulness which he believes to be glandular, and which

¹ British Medical Journal, August, 1881.

² Ibid., April 13, 1912.

³ Berlin. klin. Woch., January 8, 1912.

⁴ Arch. of Diag., 1912, No. 1.

⁵ Pennsylvania Medical Journal, March, 1912.

disappears when the ulcer is cured. Opportunities will not be wanting for confirmatory reports.

PEREZ'S SIGN, AND AUDIBLE MOTOR CRACKLES. Under this heading a wide and almost unexplored region in thoracic diagnosis is briefly surveyed by Wm. Ewart,¹ with special reference to the intrathoracic tissue sounds elicited by articular movement in their relation to the detection of tuberculosis. "Perez's sign" consists essentially in eliciting sounds occasionally audible over the upper thoracic surface by actively or passively moving the arms at the shoulder-joint, and particularly by raising or lowering them. It was originally described by him in a case of mediastinopericarditis. But, as regards the interpretation of the stethoscopic sounds, a critical examination of his original case led the writer to suggest to Dr. Perez, as an alternative explanation, their possibly extrathoracic articular origin—namely, in the joints which were subjected to movement; for I could hear the same sounds when the stethoscope was applied either to the shoulder-joint or to the sternoclavicular articulation, and also along the clavicle. As pleximetric conduction along bone and cartilage would operate in both directions from any given spot, it seemed as though the scope of the sign might be further extended to include a study of *articular conditions*, and a new field opened for auscultation—namely, the stethoscopic auscultation of joints for the investigation of articular movement sounds; my previous experience having been limited to their percussion for the purposes of pulmonary diagnosis. Since then Dr. Archibald Garrod has recently submitted that new subject to a systematic examination, the results of which are given in his important paper "On Auscultation of Joints."

Shoulder Girdle Conduction is, however, also capable of picking up audible vibrations of *extra-articular* origin in the vicinity of, or at a distance from the joints, from muscles or membranes, in conditions such as described by Ralph Stockman on "The Clinical Symptoms and Treatment of Chronic Subcutaneous Fibrosis," and by W. H. Maxwell Telling on "Nodular Fibromyositis;" the most familiar instance being the vibrations to be often felt as well as heard in the scapular regions, and probably due to rubbing of thickened aponeuroses, or nodulated muscles. When of a coarser kind, they are often palpable and unmistakably extrathoracic.

The finer varieties are less easily placed, and are apt to complicate questions of *pulmonary diagnosis*. Some of them may be of "articular" origin, as admitted by Miramond de Laroquette, and conducted by the shoulder girdle; but he does not favor another alternative view, which has been prominently advocated in France—that of their connection with a "subscapular bursa." The sounds elicited by Perez's method

¹ British Medical Journal, April 6, 1912.

present, therefore, considerable variety in kind, in degree, and in possible derivation, and include "intrathoracic" motor crackles which bear upon the most important of our problems in diagnosis.

The Articular Motor Sounds are classified by Garrod as (a) intra-articular sounds proper, (b) periarticular, and (c) tendon sounds; and again as synovial "cracklings" of varying size and intensity, as "attrition" sounds of roughened surfaces, as "fibrous" sounds of tension or friction, and as less determinate or "mixed" sounds. Any considerable effusion supersedes sound production and conduction. Tubercular joints are usually silent; and likewise the rheumatoid, in their more acute stage, when the trouble is still chiefly periarticular.

The Subscapular Motor Sounds have been chiefly studied in France. Chauvel describes three varieties: (1) *Froissements*, which are practically physiological; (2) *Frottements*, which are rather louder, but likewise unassociated with pain; and (3) *Craquements*, which are usually more or less painful, and have been compared by Zaphariadès to the noise that a horse makes in chewing its oats. *The surgical* and operative aspects, are limited to the removal of any scapular or costal exostosis, or of the crepitating bursa if present, or perhaps to a plastic muscular insertion between the thoracic and scapular surfaces, unusual and almost exceptional indications. The clinical interest is now almost exclusively of a medical order.

THE QUESTION OF TUBERCULOSIS. Professor Poncet, of Lyons, who entertains well-known views as to the frequency of a chronic tubercular inflammation, or *tuberculeuse inflammatoire*, is the chief exponent of the opinion that the cause of the "subscapular crepitus" is inflammatory tuberculosis of the subscapular cellular tissue, or of a subscapular bursa. But Miramond de Laroquette, in his masterly and exhaustive review of the whole subject, including observations on 824 cases in health and in disease, and 25 postmortem examinations, concludes that sufferers from tuberculosis are not more liable than others to this peculiarity, that, in a vast majority of instances, it is of a purely physiological nature, and that in pathological, as well as in normal subjects, its mechanism is mainly due to a relative overaction of certain muscular fibers, chiefly those of the upper dentations of the serratus magnus. It is comparatively rare in children, but occurs in both sexes, at all ages, and in all professions. Its pathological incidence is about equal in rheumatism, in tuberculosis, and in the remaining category of all diseases. It cannot, therefore, be regarded as special to any diathesis. This is also practically endorsed by E. Pallasse, the latest reviewer of the question.

The Practical Value of the Method is its simplicity when conducted with the binaural stethoscope and the amount of information which it is capable of furnishing and the clinical importance of which we cannot foretell. Clinical inquirers should make a rule of combining the

articular with the upper thoracic examination and of noting the result. The most convenient technique is to firmly steady, with one hand, the cup of the stethoscope over the front of the head of the humerus, which it fits well, or in dorsal examinations over its side or over the flat acromial surface of the spine of the scapula, while the other hand grasps the elbow and imparts to the humerus a full range of strictly passive movements. The sternoclavicular examination presents no difficulty.

(1) *For articular conditions*, as this is by far the finest test that can be applied, the examination should be *de rigueur*. A negative result from auscultation and from manipulations would be the quickest as well as the only conclusive evidence of absolute soundness. (2) *For pulmonary and pleural conditions*, the indication is obvious. The earliest detection of apical tuberculosis is the question of the day. Our time and trouble must not count. Moreover, the evidence lies close at hand and needs no technical refinements. In all doubtful cases we should proceed to submit our apical results, whether positive or negative, to the articular test. Perez has taught us that there are lesions (in my experience chiefly pleural, but sometimes pulmonary) which may give sound under the mechanical traction of movement, and not always under that of deep breathing only; while some of the sounds audible over the apices may be merely conducted from the sternoclavicular or shoulder-joints. There is no choice for us but to take the trouble to apply the necessary differential tests. Without them there can be no strictly conclusive overhauling of the chest.

Respiratory Joint Crepitations. Charles Miner Cooper,¹ of San Francisco, has already described these sounds and dwelt upon their doubtful significance. He draws attention to them for the following reasons. (1) No mention is made of them in the students' text-books. (2) They sometimes lead to an erroneous diagnosis of tuberculosis of the lung area over which they are heard. (3) Physicians who devote most of their time to the treatment of tuberculosis tell me that though they have long heard similar sounds they have never been satisfied as to their origin. It seems not improbable that similar confusing sounds may be produced in the sternoclavicular and acromioclavicular joints.

Extrapulmonary Sounds which Simulate Rales. Lastly, we owe to G. E. Bushnell (U. S. Army) a recent contribution to the same subject in the *Medical Record* (January 20, 1912). In examinations for early tuberculosis in which weighty diagnoses are frequently based upon scanty auscultatory phenomena, the following sounds are likely to mislead one: (1) The sounds produced by the contraction of muscles, especially of the trapezius. (2) Marginal sounds or crepitations heard

¹ Journal of the American Medical Association, June 4, 1910, p. 1865.

during inspiration over the base of the lungs and not associated with other evidence of disease. (3) Sounds originating in the sternum and in its articulations. (4) A fine crepitation elicited by pressing the stethoscope rather firmly on the skin of certain patients over muscular areas of the thorax. These are finer sounds than those due to pressure of the stethoscope on lobulated fat, and he thinks due to juicy tissue, whether subcutaneous or muscular. They do not occur in clinical edema in which the tissues are filled with fluid. But if the state of the nutrition be such that there is a tendency to an accumulation of fluid above the normal, but short of true edema, the fluid might conceivably be displaced by pressure with the production of sound. But if this be the explanation, no reason is apparent why the phenomenon should be confined to the thorax.

PULMONARY AFFECTIONS

Asphyxia: Venesection for "Drowning." The successful experience related by J. F. Briscoe was a striking demonstration of the efficacy of blood-letting in drowning, and *a fortiori* in other accidental forms of asphyxia where no obstruction exists in the air passages. Leonard Hill¹ quite agrees that venesection is a sound method of treatment; but it is one which the layman cannot apply, while able to carry out the "alternating" method which he has proposed.

Postoperative Drowning. The Grunbaums² use that expression in its derived pathological sense of "pulmonary edema," to call attention to the fact that many, if not almost all, the cases of surgical collapse are "infused," without much regard to the question whether the collapse is due to blood deficiency from hemorrhage or to fall of blood pressure. The immediate results are often satisfactory, though too often only temporary; but the frequency with which pulmonary edema is ultimately registered as the cause of death raises serious doubts whether the remedy may not have greater risks than the condition for which it is resorted to. They lay stress upon the circumstance that almost invariably the anesthetic used in the fatal cases had been ether, and that, in many cases, preoperative disease of the kidneys as well as of the lungs had existed. This points to the necessity for caution in several important directions, and not least in that of obtaining evidence as to the renal adequacy of the subject. Whenever it is suspected that saline infusion may be necessary, an anesthetic other than ether should be chosen. In all cases caution is urged in regard to the rapidity of its administration, to the constitution of the intravenous injection, to the temperature at which it is given, and to the total quantity intro-

¹ British Medical Journal, February, 1912.

² Ibid., November 21, 1911.

duced. They hold that saline infusion, especially intravenous, should be used only to replace fluid lost from the body; that fall in blood-pressure due to other causes should be treated by other therapeutic means; and that the infusion should be carried out with the same care and skill as the main operation. If renal insufficiency be suspected, intravenous infusion, especially in conjunction with ether as an anesthetic, is better avoided altogether. Rectal infusion appears to be less dangerous, and subcutaneous infusion seems to stand between the two.

"Infusion à outrance" suffers from the same fatal fallacies which we can trace in the past to a misguided overuse of the lancet and of alcohol, the evils of the remedy being mistaken for those of the disease, and for an indication to increase the dose. George H. Evans¹ dwells upon that theme. He believes in the toxicity of the massive overdoses of sodium chloride which sometimes have been administered by accident. But its "relative" toxicity is too often overlooked in infective toxemia, and particularly in that of pneumonia. Whether diminution in chloride excretion be due to the retention of the salt in the pneumonia exudate or to abnormally low absorption from the intestinal tract, the fact remains that the introduction of salt solution can result only in increased retention, and is a procedure both illogical and pernicious.

The harm from any excessive bulk of water introduced is probably even greater. The value of a restriction of fluids in cardiac insufficiency, first urged by Oertel, has now been almost universally accepted, particularly for heart and kidney lesions accompanied by hypertension. The effects of hydremia on a weakened heart require no emphasis. Even with prompt excretion by the kidneys, skin, or lungs, the task imposed upon the heart increases with the fluid introduced, regardless of the manner of introduction, with due exception for "colonic flushing" in which all the water introduced is immediately expelled. Competent hearts and kidneys are alone capable of successfully handling so severe a therapeutic imposition.

Acute Pulmonary Edema. A. Robin² gives the following etiology: (1) Renal disease, especially interstitial; (2) aortic affections and arterial cardiopathies; (3) pleuropulmonary affections; (4) thoracentesis, when the effusion is too rapidly withdrawn; (5) infective states, eruptive fevers, acute articular rheumatism, influenza, typhoid, erysipelas; (6) certain affections of the nervous system; (7) intoxications, acute alcoholism, and dyscrasia, when the kidney is damaged; and (8) the injection of saline solutions (owing to sudden increase of arterial tension), inhalations of nitrite of amyl, overuse of iodide of potassium, and, lastly, gout. In most instances, it is the consequence of Bright's

¹ Journal of the British Medical Association, December 30, 1911.

² Medical Press and Circular, February, 1912.

disease; and the prophylactic treatment is that of chronic nephritis. The mechanism of the attack implies a renal, a cardio-arterial, and a bronchopulmonary factor, in addition to the exciting cause. Its treatment, if immediate and energetic and including free blood-letting, will succeed in 8 cases out of 10. The after-treatment should consist of cardiotonic doses of digitalin, of a lactovegetarian diet, and of an endeavor to reduce arterial tension by four doses, at an hour's interval, of a mixture of sodium nitrite, silicate, and lactate, with potassium bicarbonate.

A CASE OF PAROXYSMAL PULMONARY EDEMA examined after death suggested to McNeil¹ "giant urticaria" of the pharynx and larynx as the probable causation. Giant urticaria may be caused by alcohol, syphilis, various drugs, hysteria, the climacteric, intestinal parasites, abnormal genital conditions, or by faulty or peculiar metabolic processes sometimes induced by certain articles of diet.

APICAL PULMONARY EDEMA OR TUBERCULOSIS. R. Brunon,² in discussing this diagnosis for which an occasion may sometimes occur, lays stress upon its importance in connection with the *treatment by diet*; it needs to be highly supporting in phthisis, and "the reverse in nephritis" for which restriction to a milk or milk-vegetable diet is essential. Is this a sound principle?

In the *Proceedings of the Royal Med.-Chir. Society* for 1898, I published a treatment for "Tubal Nephritis with Chronic Anasarca by Drainage and Feeding," which aims at a cure on the principle of nourishing the languishing and toxin-ridden renal cells by fresh and full-fed plasma. That view seemed to be too novel for approval. The method met only with severe criticism on its collateral aspects; but its fundamental principle was not discussed: It is, I believe, unassailable. My cases showed that great relief and remarkable improvement resulted from free incision at the ankles and continuous drainage by posture. The immediate result was a restoration of the kidney function, with free *diuresis*, a washing out of the blood, and a *revival* of all the powers of the economy, including the alimentary—which in these cases are essentially sound though depressed like all the rest by the general intoxication. The next step was to exchange at once the "exclusive milk" for a generous and unrestricted diet henceforth free from any uremic risks, as the obvious basis for the regeneration of the decaying renal tissues. This, I contend, is not only the rational but the practical and only successful treatment, though it is only applicable, in its simplest form by drainage, in anasarca cases. In others, the washing out of the blood, which is the basis of the *nutritive plan*, must be otherwise secured. If this method is so beneficial in the late degenerations

¹ British Medical Journal, August 19, 1911.

² Presse Méd., May 3, 1911.

of chronic renal anasarca, how much more in that of acute nephritis where the renal structures have only just entered upon those serial changes which sometimes happily are a self-limited cycle, but too often, if unrelieved by timely treatment, are fatally progressive.

Pulmonary Emphysema. THE ETIOLOGY has again been investigated, in the direction of "professional blowing," in 22 musicians by Becker¹ in his comparative studies on vital capacity. Undoubtedly the tendency in these "professionals" is to an overdistention of the upper part of the lungs; but he believes that diffuse chronic emphysema generally has a different origin, viz., in chronic inflammatory narrowing of the bronchi.

FREUND'S CHONDROTOMY is discussed in four papers by himself,² and by Von den Velden, Hansemann, and Mohr. Velden, who gives the sequel in 10 cases operated including one autopsy, dwells upon the necessity for continued respiratory exercises to maintain and develop the advantage from it. Hansemann limits its indications to the earlier stages, both in phthisis and in emphysema. Skiagraphy, as shown by Mohr, is of great assistance as a guide to a decision.

For *Emphysema*, Delbet³ resected the second, third, fourth, and fifth right costal cartilages successfully, in a woman with bad symptoms, with immediate and permanent relief. Not fewer than four should be resected, but he thinks on one side of the chest only.

For *Asthma*, Hirschberg's⁴ novel "surgical" treatment of a pigeon-breasted girl, aged twelve years, was eventually a success; though a first resection of 7 cm. of the right fifth, six, and seventh right ribs was followed after a month by relapsing rigidity and asthma. He then resorted to the formation of a "pseudarthrosis" at the sternal insertion of the second and third cartilages, by chiselling in the sternum a 1 cm. furrow, while sparing the posterior sternal membrane. There was again some tendency to ossification suggesting the desirability in future operations of a more complete removal of the periosteum; but the patient was relieved of all but the slightest reminders of her trouble, and returned to school.

THE TREATMENT OF SUBCUTANEOUS EMPHYSEMA whether surgical, spontaneous, or occurring in labor, as in M. Stock's⁵ case where it took eight days to recover, is, according to E. Biondi,⁶ an exceedingly simple matter. In a case of broken ribs and in one of ruptured vomica, with extensive emphysema threatening suffocation, the cure was obtained in a few minutes by releasing the gas through a puncture needle connected with a wash-bottle containing a little antiseptic solution. The lesions were too severe for recovery; but the patients were at once relieved of their distress.

¹ Cf. Journal of the American Medical Association, June 3, 1911, p. 1691.

² Arch. f. k. Chir., 1911, xxi.

³ Jour. d. prat., November 4, 1911.

⁴ Volkmann's S. kl. Vortr., No. 604.

⁵ Lancet, March 16, 1912.

⁶ Gaz. d. Osp., February 29, 1912.

Apex Sporotrichosis Simulating Tuberculosis. Meyer¹ refers to his own and to Pierre Marie and Gougerot's cases. In R. Grant's² case, the affection was localized to the left base. A. Dighton³ urges an *examination of the nose* as essential as shown by his own observation, though none has been reported in the published cases. Bridge's recent paper refers to the difficulty of cultivating and identifying streptothrix. A. Posselt,⁴ mentions that repeated examination of the nasopharynx and sputum may be necessary for diagnosis in apex cases. He distinguishes a "pulmonary" form, and a separate "bronchial" form of invasion, and quotes Karewski as insisting upon the bronchitic antecedents.

TROPICAL BRONCHOMYCOSIS has been extensively studied by A. Castellani⁵ as closely resembling tuberculosis. He describes twelve separate varieties, all belonging to the endomyces.

FUNGUS TRACHEOBRONCHITIS. Of this, 2 cases are reported by G. H. Hoxie and F. C. Lamar⁶ with illustrations which suggest that the fungus was an aspergillus. The patients had improved, and one of them had recovered under treatment.

Pulmonary Surgery. Mauclore's⁷ review is not encouraging. Forlanini's nitrogen pneumothorax is alone worth considering, though he does not advocate it, in view of such complications as eclampsia, gaseous embolus, pulmonary edema, subcutaneous emphysema, and pyothorax. Its indications consist in unilateral disease not too advanced and frequent hemoptysis. It is contraindicated in advanced bilateral lesions and pleuritic adhesions. For all the rest he has not a good word to say: Diasters only from *intrapulmonary injections*; one isolated success in 45 *pneumotomies* for drainage collected by Tuffier; Ruggi's *pneumectomy* fatal in all his cases, though three cases of *apex-extirpation* were cured; *thoracoplasty* thoroughly disappointing; and, lastly, Freund's *upper costal resection* based upon a pure hypothesis, and scarcely indicated in tuberculosis though it may have helped emphysema. Yet Mauclore's pessimism is given the lie by some recent achievements.

POSTERIOR COSTECTOMY. Wilm's⁸ immobilizing operation for unilateral tuberculosis and for total empyema, by dorsal resection of the upper ribs combined with anterior chondrotomy, is plausible and surgically defensible. His latest report confirms the satisfactory progress of his three cases. Cough and expectoration entirely ceased three or four weeks after the surgical collapse of the vomica. This encourages a hope that early bilateral cases might benefit from small

¹ Rev. Méd. Suisse R., January 20, 1912.

² British Medical Journal, February 17, 1912.

³ Ibid., March 16, 1912.

⁴ Med. Kl., August 27, 1911.

⁵ Lancet, January 6, 1912.

⁶ Journal of the American Medical Association, January 13, 1912.

⁷ Cf. Jour. des prat., xxvi, 1912.

⁸ Münch. med. Woch., November 21, 1911.

symmetrical resections of the upper three ribs, easily conducted under local anesthesia. He points out that the purpose is exactly the reverse of that advanced for Freund's operation.

PLEUROTOMY V. PLEUROCENTESIS. Vanverts¹ supports the universal opinion that pleurocentesis is superior to pleurotomy in cases of tubercular purulent pleurisy, and also in non-tubercular and non-pneumococcic pleurisies. In pneumococcic purulent pleurisies, the author strongly advises pleurotomy followed by aspiration as an adjunct. In purulent encysted pleurisy, the same treatment should be employed. If, on exploring for such a collection, the exploratory incision should pass into a sound pleura, the opening should be closed before making another exploration.

A CASE OF RESECTION OF PART OF THE RIGHT LOWER LOBE, performed for abscess twelve years previously, was exhibited by F. Krause.²

RESECTION AND DECORTICATION for echinococcal pachypleuritis were successful in 2 cases operated by E. Vincent.³ The indications in this affection are purely surgical; to remove all trace of the parasite, and to set the lung free.

ARTIFICIAL PNEUMOTHORAX occupies a prominent place in recent literature as preferable to fluid injections of saline solutions or of oil, and above all to resection. The technique of Arnold Cahn⁴ is by siphonage through two 2-liter flasks (for boric solution and nitrogen respectively) under local anesthesia, preferably in mainly unilateral cases with hemoptysis and acute progress. In one-third, the results are good and lasting; in a smaller fraction, a certain benefit is achieved; in about one-fifth the result is vitiated, especially through empyema. Of 17 cases reported by Piery,⁵ in three subcutaneous emphysema occurred, in two mediastinal emphysema, in one unilateral convulsions on the left side, and in one immediate coma with convulsive seizures and death in thirty-seven hours.

BRONCHIECTASIS SURGERY. J. D. Harris⁶ has had a second successful case of incision and drainage. Four x-ray treatments of the collapsed lung and of the pleura, of twenty minutes' duration, formed part of the curative measures adopted.

ATMOSPHERIC DISEASES

Mountain Sickness, and its Symptoms. Regnier's⁷ recent monograph supplies some important data and suggestions. The autopsy of a

¹ L'Echo Méd. du Nord., 1911, xv, 588.

² B. Med. Gesells., December, 1911.

⁴ Ther. Monats., October, 1911.

⁶ British Medical Journal, April 15, 1911.

⁷ Cf. British Medical Journal, Epit., November 4, 1911.

³ Rev. de Chir., December, 1911.

⁵ Lyon Méd., March, 1912.

medical man who died after an attempted ascent of Mount Blanc abandoned owing to the gravity of his symptoms, showed normal heart and kidneys. The lungs were very edematous. In the subacute or delayed form of the malady, the ascent is usually accomplished without fatigue. There may be a stage of invasion lasting twenty-four hours, during which the digestive symptoms are the most prominent, along with a condition of mental torpor; a phase during which shivering, headache, dyspnea, edema of the hands and face—the latter coincident with diminution of the flow of urine—occur; and, lastly, a stage of regression with polyuria and a return of the appetite. Regnier believes that both the acute and early attack in the ascent, resulting in large measure from a predisposition on the part of the individual, and the subacute and later attack independent of muscular exertion, are brought on by the retention of the products of incomplete oxidation, a condition of auto-intoxication. The former appears, as a rule, in the Alps at an altitude of 3500 meters, while in the Himalayas or Cordilleras it is generally over 4000 meters. Certain temperaments and stout persons offer less resistance than others. Fatigue plays an important part, but training can counteract a good deal of this. The characteristic symptoms are cephalalgia, dyspnea, tachycardia, and anorexia, followed frequently by vomiting. There is a pronounced tendency to somnolence, and syncope is a frequent occurrence. As to prophylaxis, any cardiac lesion is a contraindication; so, too, are bronchiectasis, asthma, emphysema, or renal disease. Patients suffering from pulmonary tuberculosis ought not to go beyond a certain altitude. All unnecessary fatigue should be avoided, and the ascent should be slow and regular. The iced water met with on the way may be drunk with benefit. When the ice has been reached, tea or coffee are always indicated, but no alcohol. The clothing, needless to remark, should be warm and woolly. In the acute attack, the vomiting may be allayed by sucking ice. The diarrhea regarded as a defence against auto-intoxication, ought not to be interfered with too lightly. If excessive, salicylate of bismuth, with benzo-naphthol, may be given. Syncope must be dealt with in the ordinary way. It forbids any further ascent. In the subacute attacks, if acclimatization is aimed at, the patient should rest for a time in a warm, well-aërated room, and so gradually lessen the state of anoxemia. Warm drinks will assist diuresis, and a hypotoxic regimen of milk and vegetables will lessen the strain upon the excretory organs. Inhalations of oxygen may sometimes be necessary. In that connection, the "acapnia" theory of Mosso, and the work of Yandell Henderson, would almost suggest that "sparklets" of CO₂ should form part of the equipment, as a ready means of restoring efficient pulmonary ventilations and tissue respiration. This would specially apply in the case of our modern aggravated form of Da Costa's "*mal des montagnes*," the "*mal des aviateurs*."

Compressed Air Illness and Experimental Research. Leonard Erskine Hill's¹ address is too important for any short abstract, and must be given in his own words. He points out that all the great advances have been gained by experiments on animals, and that, thanks to them, it has at last been made safe for man to work in compressed air, after a vast previous amount of sickness, suffering, and loss of life.

TOLERANCE FOR PRESSURE. As the diver descends in the water and air is pumped through the dress, the pressure of the air, as indicated by the manometer, always remains greater than the pressure of the superincumbent water above the diver's head. Whether from air or water uniformly pressing upon the body, the tissue fluids transmit the pressure equally, and although it is computed that an extra atmosphere means an additional total pressure of 30,000 to 40,000 pounds on the body of a man, no mechanical effect is produced. Living matter is a jelly containing about 80 per cent. of water, and, like water, practically incompressible.

It was falsely supposed that paralysis was caused by blood being pressed out of the periphery into the central nervous system, and then upon decompression, this blood underwent a sudden revolution and caused hemorrhages in the nervous system. The same false views are still current in the daily press to explain the symptoms shown by aëroplanists. The altitude sickness has nothing to do with the mechanical effect of compressed air. Upon going into a caisson up to a pressure of several atmospheres, no change is visible or audible in a man's circulation beyond an alteration in the pressure in the middle ear, easily relieved by opening the Eustachian tube; and a compression of any gas which may happen to be in the alimentary canal, and this leads a man to tighten his belt.

THE WANT OF OXYGEN. High altitude sickness is entirely due to want of oxygen. At an altitude of 18,000 feet (one-half the full barometric pressure) a man, upon filling his lungs, takes in only half the weight of oxygen he would at the sea level. His respiratory and circulatory organs are scarcely able to work sufficiently hard to get the required amount until he gets into training at high altitudes by exercise and by the increased formation of hemoglobin which carries the oxygen to the tissues, and the alteration in the alkalinity of the blood, thereby increasing the readiness with which hemoglobin gives up its oxygen to the tissues. The breathing of oxygen entirely removes sickness.

While a man depends upon the pressure of oxygen in the atmosphere, a fire depends upon the percentage. At ordinary atmospheric pressure, a man can breathe 17 per cent. of oxygen without feeling the slightest symptoms, while at this percentage a fire will not burn. On the other

¹ Cf. *British Medical Journal*, February 17, 1912, p. 348.

hand, at great altitudes, where the partial pressure of oxygen is halved but the percentage of oxygen remains the same, a man becomes distressed but a fire will burn. Hence the danger of *aëroplanists* trying to beat altitude records.

THE RANGE OF WATER PRESSURES COMPATIBLE WITH LIFE. No symptoms ever occur when a man is under compressed air. All the illness results from decompression. The mere mechanical pressure uniformly applied is of no importance to living matter, since life can exist in the greatest depths of the sea yet sounded, where the superincumbent pressure may equal two, three, or even five miles of water.

"With the help of Sir Charles Parsons of turbine fame, and a most powerful hydraulic press which he has constructed, I have recently been able to investigate the effect of high pressures of water upon life. So powerful is the press that Sir Charles Parsons has compressed water to 80 per cent. of its bulk. Some years ago a French observer, Regnard, compressed living aquatic animals, frog's muscles, etc., to 500 or even 1000 atmospheres, and he found that, at these high pressures, the tissues became stiff and took up water, and that life was destroyed. Sir Charles Parsons and I have found the same thing to happen. Frogs' muscles, exposed to 300 atmospheres for two hours, remain normal in appearance, and excitability is retained, not only in the muscles, but in the nervous system also."

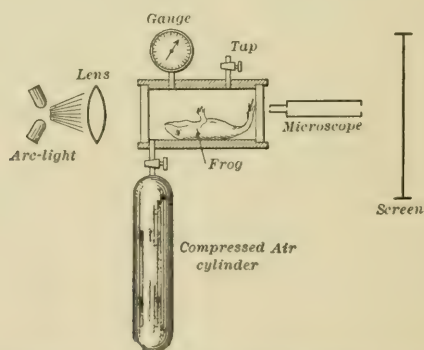


FIG. 1.—Circulation in frog's web demonstrated under pressure.

THE MECHANISM OF TISSUE DEATH FROM PRESSURE. "The reflex action, the response of the nerves to excitation, the beat of the heart, are all unchanged. But 400 atmospheres' pressure for two hours entirely destroys the microscopic structure and abolishes excitability altogether. Furthermore, the question is one of time as well as of pressure. A frog with the skin intact will stand ten minutes at 500 atmospheres without much hurt, but with the skin off, the nerves and muscles are destroyed in that time, becoming opaque in appear-

ance, and showing on microscopic examination that the muscle fibers have broken in places, and the cross-striations have been destroyed. From the nerve fibers the myelin can be teased out in droplets quite easily and the empty sheath left. The nature of the skin protects certain animals. For example, a gnat's larva survived two hours at even 700 atmospheres, but was killed in a similar time at 900 atmospheres. Oysters survived an exposure to 700 atmospheres for ten minutes, but were killed, as was shown by their shells gaping open and by their opaque appearance, after a brief exposure to double that pressure."

"All our experiments go to prove that life is destroyed by several hundred atmospheres of water pressure, the water apparently becoming of such a concentration as to destroy the chemical structure of the living protoplasm. These experimental results are to a certain extent contradictory to those obtained by deep sea soundings, for many forms of life, fish and otherwise, have certainly been found at depths of two or three miles. If life exists at the greatest depths, where the pressure may be a thousand atmospheres, we may be sure that the protoplasm has become evolved in such a way as to be immune to the high pressure of water. By means of a small chamber fitted with transparent windows, together with a hydraulic pump, I have been able to submit goldfish, which possess a swim-bladder, to a thousand pounds of pressure within a few seconds and to observe their behavior. They sank like a stone to the bottom immediately, owing to the sudden compression of the swim-bladder. After a time, having adjusted the amount of gas in the swim-bladder—no doubt by secretion—they began swimming about again, unharmed by pressure. I have also projected on the screen the shadow of the beating heart of a frog, submitting it to 50 atmospheres. The delicate structure of the heart continued to carry out its rhythmic beat unaffected by this enormous and sudden alteration of pressure. Similarly, muscle contracts normally when suddenly submitted to a pressure of air equal to 50 atmospheres. It is true that after a time the contraction languishes, but this is not due to pressure *per se*, but to poisoning by the high pressure or concentration of oxygen. The mechanical theories of compressed air are also refuted by this experiment. I stretched the frog's web over the glass window of the small pressure chamber and illuminated it by the arc light, so that the circulation of the blood was projected on to the screen. I found that the circulation remained unchanged on the pressure being rapidly raised by 20 or even 50 atmospheres. The manometric records of blood pressure taken from mammals show no noteworthy change when the pressure is raised to 3 atmospheres."

THE DIVING GEAR AND HELMET. "By means of valves, the diver can adjust his specific gravity so that he is only slightly heavier than the water and can move easily along the bottom, by filling his dress

with more or less air just as a fish fills its swim-bladder. He can go down rapidly, 100 feet in two minutes, but it is dangerous to fall down, for if the pump does not keep up with the water pressure, a cupping effect is produced and the diver may suffer hemorrhage from the lungs. If the dress becomes overfilled with air—and this may happen when the men who are pumping send down too large a quantity—the diver is blown up to the surface, and in the case of the old style of dress he may become helpless and unable to open his valve, arms, and legs being blown stiffly out. To prevent this accident, in the new diving dress the legs are laced up. The helmet also is provided with an emergency valve or spit-cock, which the diver can open and thus let out excessive air. For Haldane has proved that the previous complaint of oppression was due to an increased partial pressure of carbonic acid in the helmet owing to deficient ventilation. It is not the percentage, but the absolute pressure of the carbonic acid which controls the breathing. There is normally about 5 per cent. of an atmosphere of carbonic acid in the lungs, and the respiratory centre so works as to keep the partial pressure always the same. Thus, while in our lungs at 1 atmosphere we found 5 per cent. carbonic acid, at 5 atmospheres we found on analysis 1 per cent. But the partial pressure was 1×5 , so that the proportion still remained 5 per cent. of an atmosphere. In order to keep the carbonic acid in the helmet down to a bearable concentration, it is necessary that the same volume of air should be sent through the helmet, the volume being measured at whatever pressure the diver happens to be subjected to—that is to say, at 2 atmospheres the amount of air, adequate at 1 atmosphere, which is driven down to the diver must be doubled, at 3 atmospheres trebled, at 6 atmospheres increased sixfold. Under the old conditions of working, often with leaking pumps and tired men to pump them, the ventilation has generally been actually less than at atmospheric pressure, not six times greater, as it ought to be at a depth of 165 feet. A small increased partial pressure of carbonic acid, even up to 2 or 3 per cent. of an atmosphere, will not stop the diver from doing efficient work; but at 4 or 5 per cent. of an atmosphere the pulmonary ventilation is increased from 200 to 300 per cent., and if the diver is working hard, his breathing will become distressing and the feeling of oppression intense."

HILL'S IMPROVED DIVING DRESS AND HELMET. In order to get adequate ventilation at deep pressures several pumps must be linked up together, and a great many men are required to keep them working. To avoid that excessive labor, Hill is working at an improvement of the diving helmet which will enable the diver to do efficient work at deep pressures even when only one pump is employed, and will save a good deal of hard pumping work. He has also contrived a "self-contained" diving dress fitted with cylinders containing compressed air enriched with oxygen to 50 per cent., and it has a caustic soda

chamber. "The oxygen supply is delivered 5 liters per minute to the helmet by a reducing valve, and the force of the oxygen stream is utilized by means of an injector to circulate the air in the helmet through the caustic soda chamber. No lifeline or air-pipe is carried, only a light telephone cable, and this makes the dress suitable for the exploration of flooded mines, tunnels, shafts, etc., through which it is impossible for the diver to carry great lengths of heavy air-pipe and life-line. Air containing 50 per cent. of oxygen is used in place of pure oxygen, in order to avoid the risk of oxygen poisoning."

The Cause of the Illness and of its manifestations was suggested by Hoppe-Seyler and made clear by Paul Bert, the latter showing by experiments on animals that nitrogen gas is "dissolved" in the blood and tissue fluids in proportion to the pressure of the air, and that the dissolved gas, on too rapid decompression, bubbles off and effervesces in the blood of animal or man. The bubbles, by blocking up the capillaries and cutting off the blood supply here and there, produce the symptoms. Exposure to high atmospheric pressure has no ill effect until the pressure becomes so great that the partial pressure or concentration of oxygen acts as a tissue poison. The illness which occurs on decompression is prevented by making the period of decompression sufficiently slow to allow time for the dissolved nitrogen to escape from the lungs. When Robert Boyle submitted animals to the action of his air pump, he observed that bubbles of air might be set free in the blood, aqueous humors, etc. And in these experiments we find the germ of Paul Bert's discovery.

When Hill began his investigation some fifteen years ago Paul Bert's work was almost unknown, so that the same conclusions were independently reached by him. Exposed to 1 atmosphere at body temperature, the blood dissolves a little less than 1 per cent. of nitrogen; at 2 atmospheres 2 per cent., at 3 atmospheres 3 per cent., and so on. The tissue fluids take up the dissolved gas in the blood, and, with time, the whole body becomes saturated. This process of saturation takes a certain time, since the blood forms but 5 per cent. of the whole body weight, and the blood must carry the nitrogen from the lungs to the tissues. Probably some 5 kg. of blood circulate through the lungs per minute, and this blood conveys the dissolved nitrogen to a tissue weight of 60 to 80 kg. Vernon has shown that fat dissolves some five or six times as much nitrogen as water, and the discovery of this important fact makes it clear to us that the fat man will dissolve far more nitrogen than the lean man and become saturated much more slowly. It is clear, therefore, that fat men must be eliminated from all high pressure work. Out of 30 autopsies which have been done on fatal cases of caisson illness, gas bubbles have been visible in the bloodvessels in 19 instances. Most of the other cases were old-standing lesions of the spinal cord. The paralysis is due to the local death and degener-

ation of the spinal cord owing to the blocking of the circulation there by the bubbles.

"The gas pump shows that the amount of dissolved nitrogen in the blood varies with the pressure—roughly speaking we found 1 per cent. per atmosphere. We have exposed rats to 10 or 20 atmospheres, killed them by instant decompression, then opened their bodies under water, and collected and analyzed the gas which has been set free. We found from 6 to 16 per cent. of carbonic acid, a trace of oxygen, and 80 to 87 per cent. of nitrogen, the volume of nitrogen corresponding roughly to the saturation at the pressure employed. Major Greenwood and I have tested upon ourselves the rate of saturation, using the urine as a test fluid. We were compressed in a large boiler fitted with electric light, telephone, and taps for slow decompression. The urine collected in sealed bulbs was evacuated by the gas pump, and we found that the urine secreted during the next ten minutes after reaching any given pressure was saturated with nitrogen at that pressure. But in spite of slow decompression, we often found that our urine was still supersaturated as we came out of the chamber. A certain amount of supersaturation is not dangerous. The colloidal nature of the blood prevents the bubbles of nitrogen from forming easily.

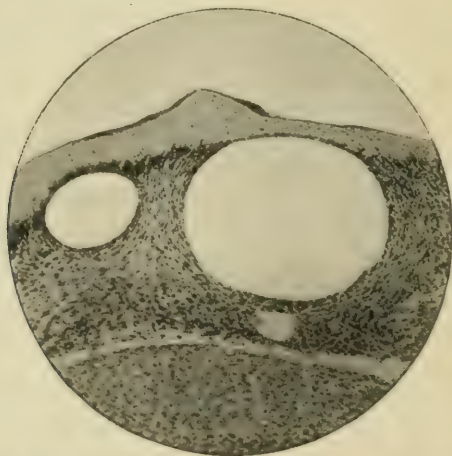


FIG. 2.—Bubbles of oxygen in brain of mouse compressing cerebral cells. Decompression from 12 atmospheres O_2 . Mice can recover from such, the O_2 being absorbed.

THE DANGERS OF RAPID DECOMPRESSION. To demonstrate the bubbling of nitrogen on rapid decompression, I spread the web of a frog's foot or a bat's wing over the glass window of the small pressure chamber. The circulation of the blood is projected on the screen with the aid of a microscope and an arc light, and we are able thus to observe the circulation under 20 atmospheres of air pressure and to watch the

bubbles forming in the capillaries on rapid decompression. We are able to see that decompression diminishes the size of the bubbles and finally drives them back again into solution. When the larger mammals, such as cats and dogs, are exposed to the high pressure of say 8 atmospheres for an hour or so and are then decompressed in a few seconds, they die in one or two minutes. On the other hand, small mammals, such as mice and rats, may escape owing to their small bulk and to their rapid respiration and circulation. The heart of a mouse may beat 700 times per minute as against our own 70. Paralysis in the limbs follows too rapid decompression, or the animals fall over and become unconscious. The gurgling of gas bubbles in the heart may be heard, respiration becomes embarrassed, and the animals die. On dissection, the peritoneal cavity may be found distended with gas or the gas may be confined to the stomach and intestines. Some of the gas rises in the fermentative processes of digestion and from air swallowed during compression. Such gas may possibly be the starting point for the setting free of bubbles in the blood, and it is therefore important that men suffering from flatulence should not work in high pressures. The vessels, both arteries and veins, may show chains of bubbles, as exemplified in the photograph I am able to produce of the coils of the intestines and the mesenteric vessels. The bubbles are seen in the fat, the joints, the veins of the brain, etc., and the coronary vessels. The right side of the heart itself may be distended with them. The gas in the heart produces embolism of the pulmonary vessels, obstructs the circulation, and brings about sudden death. In the larger animals, when decompressed from eight atmospheres in five seconds, we have found the cells of the liver, kidneys, etc., vacuolated or even burst with bubbles. We have collected gas set free in the heart, and found about 80 per cent. of it to be nitrogen. The bubbles may take a long time to form, and if they form only in the fat and veins and in such organs as the liver they may do little harm, but if they are swept on into the heart and pulmonary circulation or enter the arterial system and block up the vessels of the brain and spinal cord, then it is manifest that the symptoms will be grave."

VARYING INDIVIDUAL LIABILITY. Among caisson workers, some are affected and others not, and immunity is not given by continued work in compressed air. A young man in perfect health, wiry, small, and spare, with powerful heart and deep respiration, can expel the dissolved nitrogen from his lungs far more readily than the old, the intemperate, the stout, and those who are overfatigued by excessive labor. The records of caisson workers show that men under twenty years generally escape, and that the percentage of cases is highest for men over forty years. The longer the shifts, the more complete the saturation of the body, and the higher the pressure, the greater will be the risks and the gravity of the symptoms. The men who work the air

locks and in passing material through, undergo frequent but brief compression and decompression are not affected. The records show that practically no cases occur at a pressure below 2 to $2\frac{1}{2}$ atmospheres absolute.

"IMPURE" AIR AND ITS EFFECTS. "Much has been made of the impurity of the air—in particular of the percentage of carbonic acid—as a contributory cause of caisson sickness. The ventilation of the tunnels built by the London County Council under the Thames has been carried out at an increased and, in my opinion, needless expense in order to keep the carbonic acid percentage down to a very low level. Recently I have carried out many experiments on ourselves and on students, who have been sealed up in a small air-tight chamber, and I have found—like Fluegge and his school in Germany and Haldane in this country—that it is the heat moisture, and stillness in the air which cause discomfort and fatigue, and not excessive CO_2 , deficiency of oxygen, or any supposed organic poison in the air breathed. There is no evidence standing the criticism of investigation to prove, or even to make it likely, that there is any organic chemical poison exhaled in the breath. In the absence of any toxic gases, such as an escape of coal-gas or other trade product, the problem of ventilation becomes a question of movement, heat, and relative moisture of the air. It is these latter qualities of the air which affect the skin and respiratory tract, and through their influence upon the vast area of cutaneous nerves, give us feelings of comfort or discomfort. In open-air treatment, the coolness of the air and its movement are the essential qualities which promote health by stimulating activity and metabolism and the nervous well-being of the body. Hot, moist air causes fatigue by taxing the cooling mechanism. Blood which might be going through the viscera, muscles, and brain is sent to the skin to be cooled. A rapid heart beat has to be maintained, and this fatigues the heart."

ORGANIC MATTER IN THE EXPIRED AIR. Rosenau and Amoss¹ conclusions, which do not quite agree with Weichardt's results claiming to show under special conditions a toxicity of the condensation water of expired air, have been worked out by means of the delicate test of anaphylaxis, by injecting it into guinea-pigs and determining, after a lapse of weeks, whether they had become "hypersusceptible" to normal human blood. The slight positive reactions so far obtained are interpreted by them as evidence that the condensed liquid does contain organic matter, but not of a kind to be described as "toxic," as no definite untoward symptoms were observed.

The "*Telephone Scare*" has recently been allayed by Spitta's favorable report to the Postmaster General, which confirms that previously rendered by Klein in 1905, as to the absence of any evidence of danger

¹ Journal of Medical Research, 1911, xxv, 35.

from the promiscuous use of the public telephones. But we should still bear in mind the old question as to the infectivity of the "speech spray."

CATARRH

Colds. A. Jacobi's¹ most learnedly entertaining discourse ends with the *utile dulci* of practical advice; "to protect the vasomotor system against draughts, either by open air or by draughtless ventilation; and to clean the mucous membrane and its lymphatics by systematic daily oral irrigations with warm saline solution, with slightly opened mouth and uninterrupted respiration." We have our bacilli and our trusted homely treatments; but the sum and the *summum boni* is "simple hygiene."

Localized Cutaneous Chill. W. H. Thomson's² masterly treatment of this subject throws light upon the vasomotor factor as interfering locally with the supply of "arterial" blood. He finds that the vasomotor nerves are but rarely acted on by a "general" stimulus. The stimuli are definitely local, and yet subject to certain special laws. The first law is illustrated by the intimate association of the vasomotor nerves supplying symmetrical organs in pairs. A second law is the intimate association between the vasomotor nerves of any area of the skin and those of the internal parts underneath that area." The familiar facts within our clinical and therapeutical experience fall in line with this simple explanation.

Fatigue in Relation to Colds. Both are regarded as trivial, but their consequences total up in their frequency and sometimes in their gravity to a sum of evil well worthy of the consideration bestowed by Grace N. Kimball³ to their study. Etiologically, there is a close relation between the two; and the point is made good in the paper that to avoid exhaustion is perhaps our best prophylactic against colds and their sometimes uncontrollable results.

The Intralaryngeal Injection Treatment of acute and chronic catarrh with weak boric, tannic, silver nitrate, and other solutions, has been recently practised with success by W. Wolfram⁴ particularly in cough of deep seated production, by no means a new therapeutical departure, except for the observer himself.

ASTHMA

The controversy started by Allbutt⁵ has laid bare our subconscious ignorance as to the nature of the condition. One of the writers only,

¹ New York Medical Journal, March 16, 1912.

² Medical Record, February 17, 1912.

³ New York Medical Journal, March 16, 1912.

⁴ Ther. der Geg., June, 1911.

⁵ British Medical Journal, 1911, vol. ii.

Dr. Auld, has ventured to suggest that, as Koch's bacillus solved the problem of phthisis, we may some day be provided with a definite nosological entity for asthma. The consensus of opinion is meanwhile in favor of a "symptomatic complex" rather than of a "disease," of some nervous peculiarity or perversion in which the peripheral localization of the irritation is subordinate to central factors. Among the latter, a predominant share is attributed by H. Crichton Miller, as representing the latest school, to the psychical factor: "Asthma is not an incurable disease, nor even an inscrutable enigma as alleged, but is, in most cases, amenable to rational treatment by eliminating the exciting causes, and treating by suggestion the psychic predisposition."

The Etiology of the Paroxysm of Asthma. To revert to the controversy on "Cardiac Asthma," some criticism of Harry Campbell's excursion into the wider subject of dyspnea is necessitated by the therapeutic perplexity which would arise from an unchallenged acceptance of his ingenious theory. Granted that in any case of asthma we may have failed to identify the *causa causans*, it is the dyspnea itself which becomes the immediate object of our rational treatment. Yet, he would seem to welcome the progressive pulmonary distention, which we identify with the essence of the asthmatic deadlock, as nature's method of cure. Can our optimism extend to regarding as a satisfactory solution the eventual suppression of the spasm by that asphyxial exhaustion in which the paroxysm culminates spontaneously? That is not the patient's view.

The best that might be said for a chestful of stagnant air is that it is better, for all the oxygen which it contains, than the stagnant air in a collapsed lung. The most urgent of all dyspneas is that of the *inspiratory* stenosis of glottic obstruction or spasm, or of a valvular obstruction of the trachea. This is a fatal exception to Campbell's "law" that in all cases of dyspnea the chest tends to increase in size. In this instance it suffers a progressive diminution, although we fully admit that the muscular struggle is for its expansion. But we fail to perceive that in asthma that law can operate otherwise than adversely. We still adhere to the old view that asthma is practically an *expiratory* stenosis, by relative disparity of the expiratory forces; while recognizing the possibility so well argued by Watson-Williams of a rhythmic constrictor spasm. The disparity must grow, *pari passu*, with the stretching of the expiratory muscles, and these can only be restored to efficiency by some instalment of diaphragmatic and thoracic reduction. The troublesome aspect of that law is that any form of respiratory discomfort invariably calls forth an inspiratory effort, even when expiration is the only requirement—as in the expanding lung of asthma which is still provisioned but ill satisfied with its available store of oxygen. As less air is able to escape, so much the greater becomes the inspiratory stimulus of the accumulating carbon dioxide, until the

hypercapnia reaches an asphyxial percentage and breaks the vicious circle.

The Treatment of the Paroxysm. This is still the desideratum. It must be variable with the individual, but he does not always find his particular remedy. Witness a general practitioner who appeals to the profession after trying every treatment in vain including surgery for polypi and a deflected septum, for advice how to keep the attacks further apart and to reduce the bronchitis that follows. Let us, if possible, be practical in our treatment, though this may be only symptomatic. If gentle pressure should be tolerated, let us gratify the inspiratory anxiety and render it effective by careful rhythmic expiratory compression, to assist the helpless expiratory muscles, while getting rid of some of the carbon dioxide. Oxygen, which is usually disappointing, might then be of use if inhaled simultaneously. Carbon dioxide is contraindicated unless we should be bent upon hastening the asphyxial cure. Our next concern is the relief of the bronchiolar obstruction. Pilocarpin is a double edged weapon; but, in the absence of contraindications and with the proviso of careful watching, we might try the effect of an adequately large dose of potassium iodide with plenty of hot water as most likely to hydrate the adhesive mucus and to modify the glandular action. It will also tend to lessen the spasm and to favor the action of our antispasmodics. As regards the latter, after hearing the praises of such opposites as adrenalin and amyl nitrite, or morphine and atropine, we may well ask which is the rational remedy for the spasm. No harm can result from a small subcutaneous injection of nitroglycerin. But, of all remedies, morphine will probably be most appreciated by the patient, although it may be wise to combine it with atropine and to prescribe the injection under that name. The treatment of the interval affords plenty of rational indications, but that is too large a subject for our space.

The Theories. The controversy did not fail to bring out the well-known champions of the opposing theories, besides Watson-Williams who stands out for the recognition of anatomical facts and of physiological principles in connection with the bronchial musculature, and who states that we are now certain of the existence of broncho-dilator fibres as well as constrictor.

THE VASOMOTOR THEORY had an early exponent in Wm. C. Glasgow,¹ who described asthma as a disorder of vascular irritability, and the occluding swelling was due to arteriolar spasm with high pressure, causing a saturation of the tissue with liquor sanguinis. Francis Hare Marshall's eleven arguments "form a very long array of clinical facts" in favor of the vasomotor hypothesis of the immediate causation of the bronchiolar obstruction; and he is supported by Alexander

¹ American Journal of the Medical Sciences, 1887, vol. xxxiv, p. 107.

Francis, who was converted to it by his observations on the extraordinary effects upon blood pressure of touching different spots of the nasal mucous membrane with the electric cautery. Francis sees in this an agency acting upon the vasomotor centre through sympathetic irritation in such a way as to prevent various influences whether toxic, emotional, or reflex, from adversely affecting the vasomotor system.

G. A. Gibson defends the theory of *bronchial spasm* against that of sudden vascular engorgement by referring to the thinness, small vascular supply, and freedom of the bronchial membrane from any erectile tissue analogous to that in the nose; the relief from injecting adrenalin under the skin is explained by Dixon's recent discovery that it *dilates* the smallest bronchial tubes. H. Water Verdon,¹ who reverts to his previous statement that anginal dyspnea results from spasm of diaphragmatic laryngeal and intercostal muscles due to a gastric reflex, and Duncan MacDonald, who believes that its relief occurs through the accumulating carbon dioxide in the blood acting as a relaxer of the coronary spasm, are really discussing the "cardiac" factor in "Cardiac Asthma" rather than the "asthmatic."

Mountain Climate for Juvenile Asthma. A. V. Planta's² observations on asthma confirm the rule that constitutional disorders including the "*exudative diathesis*" are much less prevalent and milder in the mountains than elsewhere. In children, the rebellious symptoms yield rapidly, as shown by the 16 cases he has treated; but they will return unless their stay in the altitude be prolonged. The diathesis cannot be overcome in a few weeks. This suggests the desirability of providing opportunities for schooling as well as sanatorium treatment to facilitate prolonged residence, if possible for a whole year. The writer can corroborate this, having sent two of his own patients to a school in the Engadine, with excellent results.

C. Staübli's³ "Indications and Contraindications for Mountain Climate" deal with the whole range of life. In an anemic man, aged sixty-five years, after four months at St. Moritz, the red cells had almost trebled and the hemoglobin had risen from 23 to 57 per cent. The question is not so much one of "age" as of capacity for "reaction." Asthma, particularly when based on the "eosinophilic diathesis," is strikingly benefited. The "adaption depression" is easily got over by two days in bed, and the "transformation of the metabolism" then proceeds steadily.

Transduodenal Lavage: A New Method of the Treatment of Chronic Ailments; A Preliminary Report of Results in Asthma and Pernicious Anemia. The title of M. Ernest Jutte's⁴ paper in the *New York Medical Journal* raises our therapeutic ambitions. He has used

¹ British Medical Journal, 1911, vol. i, p. 613.

² Corresp. Blatt, November 1, 1911.

³ Deutsch. med. Woch., January 25, 1912.

⁴ March 16, 1912.

Bullinger and von Oefele's duodenal tube for washing and flushing out the small bowel and incidentally the large bowel. After swallowing the tube about 20 cm. beyond the marked distance from mouth to pylorus, the patient lies down on his right side and drinks about 100 c.c. of water to bring the heavy end of the tube near the pylorus. Upon turning on the faucet, part of the water and secretion are to be aspirated into the flask. If the reaction is acid, the end of the tube is likely to be still in the stomach; if alkaline, presumably in the bowel, excluding a possible duodenal regurgitation. Undue spasm having been relieved by some sodium bicarbonate or, if necessary, by gastric lavage, with some practice there will be little difficulty in getting into the duodenum and in judging the position of the end of the tube. For irrigation of the bowel, disconnect the apparatus on reaching the duodenum, and attach the catheter tube to an irrigator containing about 1500 c.c. of irrigating fluid. Soap water works well, in a solution of 1 to 1000 made with *sapo medicatus*. To this solution add 14.5 grams of sodium chloride to prevent too rapid an absorption of water. While the fluid runs in, the patient lies on his back and receives abdominal massage. Within an hour he usually has a copious movement.

The results achieved in the few cases which he reports lead Jutte to anticipate recovery in further cases of bronchial asthma, primary and secondary anemia, gout, rheumatism, arthritis deformans, toxic albuminuria, so-called biliousness, chronic constipation, and other intestinal disorders.

Immediate Transduodenal Feeding by Duodenal Fistula in obstructive starvation is a much more important new departure in the domain of surgery of rescue, which we owe to Mayo Robson,¹ and of which I witnessed the performance and the complete after-success in an apparently hopeless gastric case. He enumerates the varied emergencies in which it is likely to be of use. The operation consists in taking a loop of the jejunum well beyond its origin, just sufficiently long to reach the surface without tension. A No. 12 Jacques catheter is inserted and passed for fully three inches down the distal loop. This is fixed to the margin of the incision in the gut by a silk or thread secured by two purse-string sutures one over the other. The top of the loop is fixed to the parietal peritoneum and posterior aponeurosis by two stitches and the wound closed around the tube. The patient can then be fed at once with egg, milk, and a little brandy. The whole operation is done in from ten to fifteen minutes and with no shock and very little visceral exposure. As a further precaution, the loop may be short-circuited, but this is not absolutely necessary. For success, the bowel must be placed so that it will serve two purposes: (1) To permit the passage onward of the bile and pancreatic fluid poured

¹ British Medical Journal, January 6, 1912.

into the intestine above the artificial fistula; and (2) to allow of food being introduced into the fistula without fear of regurgitation either of the food or of the intestinal contents. Suitable food is introduced at suitable intervals by means of a funnel and tube to be slipped over the catheter.

ATMOTHERAPEUTICS

Artificial Respiration. THE SYLVESTER AND THE SCHÄFER METHODS IN COMBINATION FOR DROWNING. Leonard Hill's¹ advice is to use them both "alternately," and to associate with them the "mouth to mouth" method which in children he considers to be the most effectual. This is based upon his personal experience in a double fatality affecting a man and a boy, aged nine years. In the latter, he found the primitive method easy and efficient by placing a handkerchief over the boy's mouth, and pressing a hand over his stomach to prevent inflation of that organ. The man was also cyanosed and pulseless. The Schäfer method produced great venous congestion of the face and neck, due no doubt to the expression of the blood out of the abdominal organs, the liver in particular. Upon changing, after useless efforts, to the Sylvester method, he found the congestion rapidly disappeared. Upon going back to the Schäfer method, the congestion at once reappeared. The same happened again on repeating the change. He came to the conclusion that the best thing to do in a similar case would be to change frequently from the Schäfer method to the Sylvester, and back again. This procedure evidently must keep up an artificial circulation of the blood through the head. He urges others to follow this course and not stick to the one method only.

In further comments elicited by a letter from Professor Schäfer, Leonard Hill² does not question that the Schäfer method of artificial respiration is the most simple and effective, but believes that its compressions will best relieve the right heart if applied *alternately* in the supine and in the prone position. The distended right heart of an asphyxiated animal will often give vigorous beats when emptied of blood. In such an animal, the right heart can be emptied by gravity into the abdominal vessels by lifting up the head end and squeezing the thorax. This is an easy method of producing the effect of venesection. Therefore the head end should be placed a little higher than the feet end of the body, so as to let gravity come into play. The problem is not how to get the largest volume of air in and out of the lungs, but how to get the heart beating again by forcing some oxygenated blood through the coronary vessels and by relieving the distention of the right side of the heart. If directions were given to make a

¹ British Medical Journal, January 6, 1912, p. 52.

² Ibid., p. 217.

frequent change from prone to supine posture and back again, it would not complicate the Schäfer method, and would make this method even more surely the simplest and best.

Oxygen. REDUCED ATMOSPHERIC OXYGEN SUPPLY AS A CLINICAL THERAPEUTIC AGENT: By systematic inhalations, with reductions down to 12 per cent. of the normal atmospheric proportion of oxygen, A. Schmidt and O. David¹ have obtained good results in their series of 20 cases, which included chlorosis, anemia, pernicious anemia, asthma, chronic bronchitis, and emphysema with bronchitis. They profess to have established, by experiments on animals, that a striking pulmonary hyperemia is brought about. The method suggested itself to Schmidt on the evidence that while all the bad effects of over high altitudes are the result of a diminished atmospheric pressure, their blood forming and respiratory benefits are due to the lessened partial pressure of the oxygen in the lungs which he believes facilitates its absorption by the alveolar epithelium. He hopes to provide at Reichenhall an installation of inhalation cubicles. Hitherto the expense has been prohibitive, and the inhalations have been practised in a small apparatus constructed to accommodate only the head of the subject where the normal atmospheric pressure is maintained, while that of the oxygen is reduced. As soon as this reduction is regulated to the desired percentage, fresh oxygen is automatically furnished from a collateral reservoir in the exact proportion required to replace that which is absorbed. The other constituents of the air are rebreathed after being circulated along a side tube which is constantly taking away some of the air and returning it to the respiratory chamber after passing it through suitable apparatus to relieve it of its water vapor and of its carbon dioxide. The value of the method will need further corroboration; it is a new departure in practical aërotherapeutics.

ON ARTIFICIAL RESPIRATION WITH OXYGEN. Sir Lauder Brunton² contributes an important communication under that title. Oxygen had begun to be used therapeutically soon after Priestley's discovery in 1774. He himself experimented with it for cobra poisoning with Sir Joseph Fayrer in 1874; but in 1891 he tried it clinically in pneumonia as a continuous inhalation from the cylinder by the funnel method, with good results. He describes the effect of oxygen sometimes as a cardiac stimulant as very extraordinary. "Someone, I think Sir Douglas Powell, has well said that the heart is the organ which first takes toll of the oxygenated blood returned from the lungs, and in a case of cardiac asthma I found that the tension in the radial artery, which was only equal to 75 mm. of mercury when the inhalation of oxygen was begun, rose to 150 in the course of ten minutes. When natural respiration has completely ceased, artificial respiration with oxygen may be

¹ Münch. med. Woch., May 2, 1911.

² British Medical Journal, February 17, 1912, p. 354.

kept up for some time by simply placing the end of an india-rubber tube passing from the oxygen cylinder into the patient's nostril at intervals corresponding to the natural respirations, either with or without compression of the other nostril. The force of the gas issuing from the cylinder is sufficient to inflate the lungs, and when the tube is removed from the nostril the gas is again expelled from the chest by the natural resiliency of the chest wall, aided, if necessary, by gentle compression.

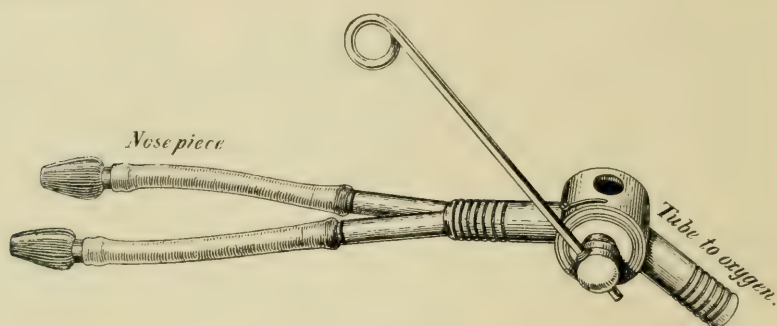


FIG. 3

This nasal method which, it should be mentioned, has been persistently advocated as the only effectual one in pneumonia by George Stoker, who uses soft india-rubber nipples as terminals for the supply tubes, is shown in the illustrations, of which Brunton gives the following description. "I demonstrated an instrument for keeping up artificial respiration with oxygen at the International Medical Congress in Rome, 1894, but the account in the reports was not illustrated and attracted very little attention. The instrument shown in Fig. 3 consists of a stopcock connected by an india-rubber tube at one end with the cylinder and at the other with two nozzles to pass into the nostrils. By moving a short lever the nostrils are alternately put into communication with the oxygen cylinder and with the open air, so that, by moving the lever alternately backward and forward, artificial respiration is kept up with the minimum of exertion, so that it might be continued, if necessary, for hours. Fig. 4 gives a general view of the arrangement of the apparatus with sections of the stop-cock at A and B. In A, the stop-cock is shown with the communication free between the lungs and the air and the communication with the oxygen cylinder is closed, this being the position in expiration; B shows the position in inspiration when the oxygen streams from the cylinder into the lungs, and the opening which communicates with the outer air is closed."

"The stop-cock is represented as being directly connected by tubing with the oxygen cylinder, but in order to prevent the tubing being blown off, or other unpleasant surprises from too great pressure of

the oxygen, it is advisable to insert a large distensible bag between the stop-cock and the cylinder. If necessary, it may be weighted by laying books upon it, so as to obtain the pressure required."

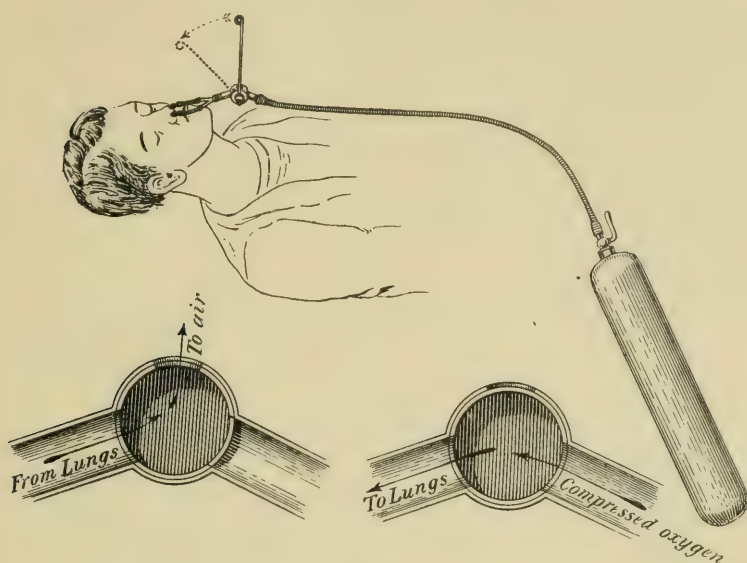


FIG. 4

THE ADMINISTRATION OF OXYGEN. Leonard Hill's¹ paper is full of practical information. He first dwells upon the absurdity of the funnel method which has so long resisted the teaching of George Stoker and others. The oxygen diffuses into the atmosphere, and the patient inspires air enriched very slightly with oxygen. Analyses of the pulmonary alveolar air obtained from subjects to whom oxygen was administered in this way showed an increase of only 1 to 2 per cent. If a most wasteful current was used and the funnel held close to the mouth, the increase was at most 10 per cent. In the second place, patients who are ill and fretful, say with pneumonia, cannot bear a tight-fitting mask. Thus oxygen cannot be administered in the most economical way by means of an anesthetic mask fitted with breathing bag and caustic soda to absorb the exhaled CO_2 . If such a method could be borne, a 20 foot cylinder would give a supply for continuous breathing of oxygen, which would last all day, for a patient in bed uses only about 250 c.c. per minute, and there are about 56 liters in the cylinder.

As regards *toxicity*, it has been ascertained by him and by Lorrain Smith, and by J. J. R. Macleod that high pressures of oxygen produce inflammation of the lung. This is only brought out in mice by a very

¹ British Medical Journal, January 13, 1912, p. 71.

prolonged exposure (two or three days) to a partial pressure of 70 to 80 per cent. of an atmosphere—that is four times as much oxygen as normal. The miners who practise wearing the Fleuss rescue apparatus for use in mines at the Howe Bridge and other rescue stations now set up in the colliery districts breathe 80 to 90 per cent. of oxygen for two hours or more, and never suffer in the least.

There is abundant evidence that the breathing of this partial pressure of oxygen has no ill effect. Bornstein has even breathed oxygen at two atmospheres pressure for half an hour without harm. It is clear that undue alarm as to the poisonous effect of oxygen has been felt by the medical profession.

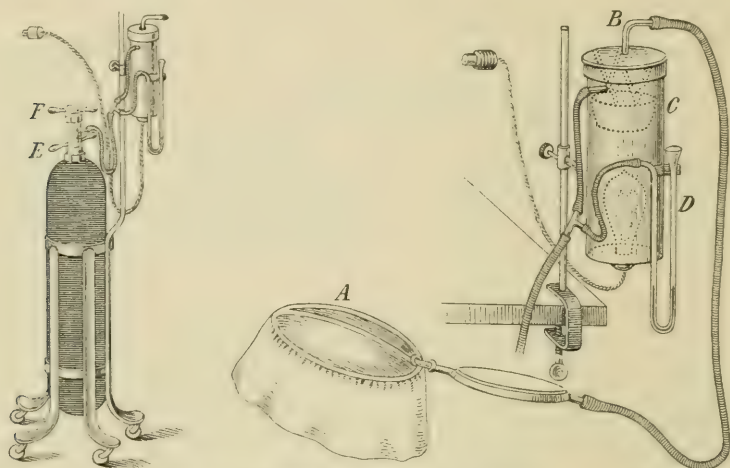


FIG. 5.—Oxygen mask and heating box (Down Brothers). *a*, The mask, which can be used with or without the heating box; *c*, the cup in which alcohol and water are placed above the electric lamp. The ingoing current of oxygen blows over the cup; *d*, the manometer, the use of which I have discarded.

The common idea that the processes of combustion in the body are accelerated by breathing oxygen is erroneous. Oxygen does not influence the metabolism of the resting man at all. A man doing very hard work is benefited because he avoids a shortage of oxygen, and can work more easily. Shortage of oxygen leads to the production of lactic acid, and this, adding its effect to that of the carbonic acid in the blood, increases the dyspnea. The same must hold good in pneumonia, if the mask will allow an efficient supply of oxygen and does not render the patient uncomfortable or fretful.

Hill has devised a celluloid face-piece, to which a curtain of washable material is attached. The handle of the mask is also the inlet tube for the oxygen. The current of oxygen flows over the mouth and nose of the patient. The current is turned on until an agreeable cooling effect is obtained, and no sense of closeness. The operator, by applying

the mask to his own face, will soon get to know the right degree of hissing noise in the tube. The patient inspires the atmosphere confined under the mask, and as a current is used sufficient to blow away the CO_2 , a very high percentage of oxygen is obtained in the alveolar air, for example, over 70 per cent. He has also contrived a heating box which can be used with the mask for evaporating alcohol and adding vapor of alcohol to the oxygen. An incandescent electric lamp is placed at the bottom of the box; one of the lamps in the ward or room can be inserted into the socket at the bottom of the box, and the wires from this attached by a plug to the socket from which the lamp was taken. A spot containing whisky or brandy, 2 parts, and water, 1 part, is placed in the box above the lamp. The current of oxygen is led through this box. There is no need to use a heating box or to wet the oxygen, unless alcohol or some other vapor is required to be given. Using the mask alone, he finds patients like the cool stream to play upon their face. The stream has to be made forcible enough to have a cooling effect, otherwise the patients push away the mask.

In the figure, a water manometer is shown attached to the heating box. This is an index for measuring the supply of oxygen, but experience has shown that it is troublesome in use; the uninitiated cannot control the tap properly and blow out the water from the manometer. A gauge is not needed. It suffices to turn on the current until a distinct pleasant cooling effect is produced on the face, and learn to use the hissing noise of the current as an index. This method of giving oxygen is thoroughly efficient, and has produced most striking results in 2 cases of pneumonia in which it was tried. The irregular pulse with its extra-systoles becomes regular, stronger, and less rapid, the ashen color of the lips becomes red, and the patient recovers consciousness. Hill proposes to construct suitable chambers for the accommodation of patients in a permanently hyperoxygenated atmosphere. This as a fact was already carried out in the shape of the cubicles devised and used for some years by Dr. George Stoker for the treatment of tuberculosis by ozonized air.

THE PHYSIOLOGICAL INFLUENCE OF OZONE. The facts established by Leonard Hill and Martin Flack¹ in their paper before the Royal Society are definite and important. Ozone, in concentrations of as much as, or more than, one part in a million acts as an irritant to the respiratory tract, and diminishes the respiratory metabolism. There is a lessened output of carbonic acid and a diminished fall in body weight, both during the period of administration and for some time after. Concentrations of several parts per million cause acute inflammatory congestion of the lungs, and animals die if kept long exposed to the ozone. Concentrations just perceptible by smell—that is, far less

¹ December 7, 1911.

than one part per million—have no injurious effect, and can be used safely in systems of ventilation. In the case of injurious concentrations, the irritation of the air passages, cough, and headache cause the breather to escape from the influence of ozone before any serious damage is inflicted upon the respiratory tract. Very low concentrations of ozone mask disagreeable smells, give a fresh quality to vitiated air, and vary the depressing monotony of air which has been artificially warmed. Ozone might possibly have some value in the treatment of diseases of the respiratory tract if used in concentrations which produced a slight irritation, by inducing locally a more abundant flow of blood and of tissue lymph.

RADIUM AND OXYGEN. Mention should be made of Lazarus and Saubermann's new apparatus for the inhalation of oxygen in a state of "high activation" by radium emanations in a closed circuit.

THE SUBCUTANEOUS INJECTION, AND OTHER FORMS OF INJECTION OF OXYGEN. I believe that the earliest instance of the subcutaneous administration of oxygen occurred in 1900 at St. George's Hospital,¹ where I have also subsequently on several occasions introduced the gas, in a very slow stream, into *the bowel per rectum*, in cases of intense abdominal pain which was apparently connected with a spasmodic contraction of the colon, and which was immediately relieved by the injection. The purpose of the original subcutaneous injection which, to avoid wounding any vein, was practised under the thin and loose skin of the leg, was not the relief of any pain, but merely to secure for the exhausted patient its respiratory value, and to provide him with a permanent supply for continuous absorption into the blood. The principle is sound; it is the same as that of the injection of air or of oxygenated air, with a view to ultimate reabsorption, into the pleura. The clinical utility of the method is a separate question to which I have not devoted any further study, although my original observations did not supply the slightest unfavorable evidence against its more extended use. The same subject is dealt with by A. A. Warden, of Paris, in a letter to the *British Medical Journal* (February 17, 1912) in connection with Leonard Hill's ingenious apparatus. Hill states that: "The object evidently being to get the oxygen absorbed as quickly as possible, surely then the subcutaneous injection of oxygen has many advantages over its inhalation, not only in diseases of the respiratory tract, but also in many other conditions—septic infections, tuberculosis, anemia, etc. For many years Professor Thiriar, of Brussels, and others, have thus used oxygen. In 1906, Dr. Albert Rouet published a case of ascitic tuberculous peritonitis successfully treated by the intraperitoneal injection of oxygen. In December, 1910, I injected several liters of oxygen in a patient with bad double

¹ *British Medical Journal*, vol. ii, p. 1099.

pneumonia. The great difficulty hitherto has been that of accurately measuring and controlling the amount of oxygen injected, the only apparatus available being the large metallic reservoirs used in commerce, or the oxygen bag. (I used Professor Thiriar's instrument filled from a large cylinder under pressure.) This difficulty has now been overcome by the admirable apparatus designed by my friend, Dr. Raoul Bayeux, and presented by him at the Academy of Sciences on November 20, 1911. It consists of three parts: (1) A light but strong and accurate 'detendeur' or decompressor. (2) A series of small cylinders containing the oxygen under a pressure of 100 atmospheres, so that a liter of the gas is about the volume of a cigar. (3) A sensitive tap that allows the oxygen to be distributed at rates varying from 1 c.c. to 1 liter per minute. I believe that in oxygen thus used we have a non-toxic and potent remedy likely to prove of use in many pathological conditions." Although my own experience of the subcutaneous method is that the oxygen is only slowly absorbed, it might have other uses than the respiratory. Our other methods possess wider opportunities; and it is clear that there is room for a more systematic investigation of the whole subject.

D. Derose,¹ of Paris, reviews the subcutaneous injection of oxygen in its French literature of the last two years (Ramond; Bayeux; Beraud's thesis; and Gouget's report in the *Presse Médicale*) since the earlier observation of Domine, of Valence, upward of ten years ago, and describes its mode of administration in asphyxial and other cases where the tracheal route is not available. As the gas is innocuous, its elaborate measurement is not essential. In the simple method suggested by Sapelier, of Nanterre, which is a replica of that which I have described for the inhalation of CO₂, the driving force is the gravitation by siphonage of the water from one bottle into a second graduated bottle which is charged with the oxygen and connected with the subcutaneous needle. The amount injected is thus roughly indicated. The needle should not be connected up to the gas supply before ascertaining that no blood escapes from it, a necessary precaution against the risk of injecting the gas into a wounded vein. According to Sapelier, in dyspneic tuberculous subjects the injection causes the temperature to fall, and determines a sensation of comfort and well-being; and sleep, previously impossible, becomes easy and refreshing. In pneumonia, the effect is even more striking. Not only do the asphyxial symptoms subside, but the temperature falls rapidly. In the toxic dyspnea of uremia in diabetes and in poisoning by oxide of carbon where the patient's state may not allow of inhalation, the injection is available and quite easy. It has also afforded great relief in asystole and in emphysema. The treatment is also indicated in

¹ Cf. Medical Press and Circular, May 1, 1912, p. 459.

bronchopneumonia and in whooping cough, in which large doses of oxygen are of the greatest service. It is free from danger, simple in application and striking in its effects, and well adapted to daily practice.

Intraduodenal Oxygen Perflation is probably the most novel method of administration. A. Schmidt¹ uses a slightly altered Einhorn's tube and injects from 2 to 4 liters twice daily, "to stop fermentation and lessen putrefactive changes." The gas escapes per rectum after an hour or two.

Carbon Dioxide. CARBON DIOXIDE AS A GENERAL ANESTHETIC. Those interested in the history of anesthesia and in the therapeutical properties of carbon dioxide will find in the *British Medical Journal* for April 13, 1912 (vol. ii, p. 843) a biographical sketch and a likeness of Henry Hill Hickman, the pioneer of anesthesia, who was buried in 1829, at Bromfield, Shropshire, at the early age of twenty-nine years, some months after his return from Paris where he attempted to obtain recognition for his discovery from King Charles X, and from the Académie Royale de Médecine after his failure to obtain a hearing in England. In his original series of experiments on animals, he had first produced the anesthesia of semi-asphyxiation by the exclusion of atmospheric air. Subsequently he resorted to the inhalation of small quantities of carbon dioxide; and, finally, he substituted for the latter nitrous oxide gas. Under the influence of this anesthetic, he performed a variety of painless operations upon them. This convinced him that could he but carry out his methods on the human subject the painless performance of major surgical operations could be secured.

The following is his own account of one of his early experiments with carbon dioxide:

"*Experiment V.* I took an adult dog and exposed him to carbonic acid gas quickly prepared and in large quantity. Life appeared to be extinct in about twelve seconds. Animation was suspended for seventeen minutes, allowing respiration occasionally to intervene by the application of inflating instruments. I amputated a leg without the slightest appearance of pain to the animal. There was no hemorrhage from the smaller vessels. The ligature that secured the main artery came away on the fourth day, and the dog recovered without expressing any material uneasiness."

The translation of an extract from the *Archives Générales*, vol. xviii, page 453, is as follows: "*Painless Operations.* M. Gerardin reported on a letter written to His Majesty Charles X, by Mr. Hickman, a London surgeon, in which that gentleman asserted he had discovered a means of performing the most troublesome and dangerous operations without pain. The method consisted in producing temporary insensibility by the methodical introduction of certain vapors into the lungs.

¹ Zentralbl. f. inn. Med., January 6, 1912.

Mr. Hickman had made numerous experiments on animals, and was desirous of obtaining the coöperation of the leading physicians and surgeons of Paris, in order to make the same experiments on the human subjects."

The reading of the letter before the meeting caused a sensation, but Hickman's discovery was received by some with derision and contempt, the only defender of it being the famous Baron Larrey, himself a pioneer in the antiseptic treatment of wounds, and the inventor of the *ambulances volantes*, who offered himself to be experimented upon. Although a committee was formed to go farther into the matter, the demonstration was apparently allowed to drop. Nothing more was heard of Hickman, his experiments or his discovery until 1846, that memorable year in the history of anesthesia, when the first surgical operation was performed on a patient under the influence of ether in the Massachusetts General Hospital on October 16, 1846, the anesthetic being administered by W. T. G. Morton.

THE CLINICAL USE OF CARBON DIOXIDE WITH OXYGEN. Ettore Levi,¹ of Florence, reports progress in the practical therapeutics of carbon dioxide, an agent which from the original experiments of Mosso on "Acapnia" and from Yandell Henderson's masterly investigations he had learned to regard as one of the most important of the body's hormones, exercising a regulative influence on the action of the heart, on the tonus of bloodvessels, and especially on the respiration. He gives the following account of his experience. "It is now nearly two years since the publication of my first article on this topic.² During this time my method has been continuously employed in the surgical clinic in Florence. Professor Burci, general director of the clinic, has made it a standing order that, prior to every operation, a gasometer containing a mixture of oxygen and carbon dioxide shall be prepared, and shall be available for immediate use. It is our custom not to wait until the patient has reached a condition of profound shock or respiratory paralysis, but, on the contrary, as soon as the slightest tendency to failure of respiratory or cardiac function appears, to administer immediately inhalations of the gas mixture. The number of cases thus treated during the last two years at the surgical clinic of the Florentine university now amounts to several hundred. In no case have we observed any ill effects from the treatment. On the contrary, in several traumatic cases in which, under chloroform, breathing has entirely stopped, we have observed a prompt return of practically

¹ Cf. Journal of the American Medical Association, vol. lviii, p. 773.

² Levi, Ettore. Nota preventiva sulle applicazioni terapeutiche, nella pratica, chirurgica e medica, di miscele di ossigeno e di anidride carbonica. Accad. med. fis., Firenze, March 16, 1910; Studi sull'azione fisiopatologica dell'anidride carbonica, e sulle applicazioni terapeutiche, nella pratica chirurgica e medica, di miscele di ossigeno ed'anidride carbonica, Rev. Crit. di Clin. Med., 1910, Nos. 30 and 31.

normal conditions. As evidence of the success of this procedure I would particularly refer to the papers published by Professor Marchetti,¹ and by Dr. Cresenzi,² and to a case of suicide by hanging recently treated in the surgical clinic of Professor Stori and Dr. Abetti. Prolonged artificial respiration, inhalations of oxygen and hypodermic stimulation had not given the slightest result. The case was practically given up as hopeless when it was suggested that the carbon dioxide oxygen mixture should be administered. After a few minutes' inhalation of this mixture, spontaneous respiration returned. This method has also proved of service in the treatment of medical cases, particularly in cases of profound asthenia due to toxemia. My experiments have shown that in carbon dioxide properly diluted we possess a therapeutic agent of extraordinary potency. At the outset of my investigations I experimented on animals. By means of the single or combined action of nitrites, chloroform, and morphine, failure of respiration was induced. The animals were then made to inhale a mixture of oxygen with various percentages of carbon dioxide, from 10 per cent. to 30 per cent. In every case there was an almost immediate return of the breathing and the effects of the inhalation were found to last for some time after it was discontinued. I then tried the administration of these gas mixtures to patients who, because of trauma or extensive and prolonged operation, had sunk into a partially or completely comatose state. The effects were at times brilliant, particularly in those cases in which the breathing had become shallow, irregular, or of the Cheyne-Stokes type. With mixtures of from 5 to 20 per cent. of carbon dioxide in oxygen, the depth of breathing and the regularity of the rhythm was notably improved. The most satisfactory results were obtained with a mixture containing 15 per cent. of carbon dioxide. In cases which exhibited Cheyne-Stokes respiration, the periodical rhythm was immediately stopped and normal breathing was not only restored, but continued for some time after the inhalation was ended. In such cases not only was respiration improved, but there was a marked improvement in the condition of the circulation. The disappearance of cyanosis was one of the most striking features."

Commenting upon these observations, Levi remarks that they seem to afford an explanation of the good effects obtained in surgical practice from the method of narcosis with artificially reduced circulation. The remarkable rapidity with which patients subjected to narcosis under this condition recover consciousness is probably due to the sudden

¹ Marchetti. Ueber die Anwendung der Gemische von Sauerstoff und Kohlensäureanhydrid nach Dr. E. Levi in der Praxis der Chloroformnarkosa, Wien klin.-therap. Wochenschr., 1910, No. 40, p. 961.

² Cresenzi. Die Anwendung der Gemische von Sauerstoff und Kohlensäureanhydrid in der chirurgischen Praxis, Wien. klin.-therap. Wochenschr., 1910, No. 40, p. 960.

return to the general circulation of a large amount of blood rich in carbon dioxide when the lower limbs are unbandaged. "Following up this suggestion, we have found that the use of a gas mixture containing from 10 per cent. to 15 per cent. of carbon dioxide after the completion of an operation is very effective in causing a prompt awakening of the patient. It seems also to tend to decrease the postchloroform vomiting. This is doubtless referable to the rapid elimination of chloroform from the blood and tissues under the influence of the increased respiration induced by the carbon dioxide."

Some historical interest attaches to this important communication, as it shows that the earliest systematic application on a large scale of the fruits of Mosso's discovery was to be carried out in the land of his birth. It comes as a reminder that, while surgery is reaping the benefit, the method and its uses, which are essentially medical and were originally introduced into clinical medicine, are still unutilized, in the vast field which is specially their own, for the manifold relief of suffering and for the treatment of affections which include some of our most fatal and intractable medical diseases.

A SIMPLE METHOD FOR THE THERAPEUTIC INHALATION OF CARBONIC ACID GAS. There is no longer any question as to the therapeutic possibilities of the agent, but they remain untried because there is no convenient handle to work them. The purpose of my method is to overcome this practical difficulty of handling.

Although some observers had had their doubts as to the size of the toxic dose of CO_2 , physiological teaching remained solid until seven years ago as to the mainly "toxic" influence of the gas. During the closing years of the last century, having formed definite views as to the mode of action of the famous Nauheim heart treatment, I proceeded to study clinically their therapeutical application mainly for the practical relief of cardiac, vascular, respiratory, and of various painful spasmodic affections. The original apparatus and technique were elementary. The next step was the use of "Kipps's CO_2 generator," but this was ultimately discarded for small portable gas "cylinders" specially made to order. With these, the greater part of the clinical work was personally conducted, with careful watch over the bubbling bottle and over the condition of the patient (see references appended to the paper.)

The simple apparatus and method now described are specially intended for use in private practice and will be readily understood from the illustrations (Figs. 6 and 7). The gas is to be obtained from one or more ordinary soda water siphons, each of which can liberate enough of it to fill a "Winchester quart." Two of the latter are needed, with sufficient india-rubber tubing, and clips. These

¹ Cf. British Medical Journal, October 7, 1911, p. 805.

having been suitably connected, and one of them filled with water, the soda water is carefully passed into this one which will collect the gas and empty itself *almost* completely (to be clipped off in time) into the second (empty) bottle. When the second bottle now full of water is raised, the water, propelled by siphonage, passes back to the first bottle and forces the gas into the tube for inhalation by the patient.

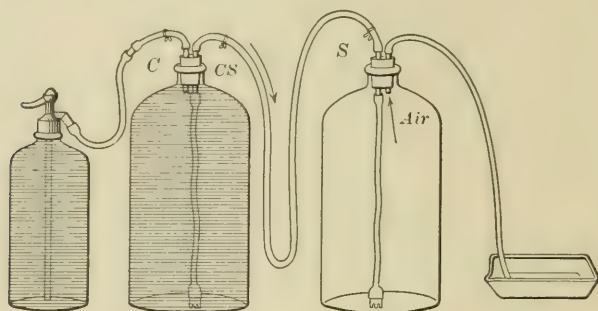


FIG. 6.—Position before charging.

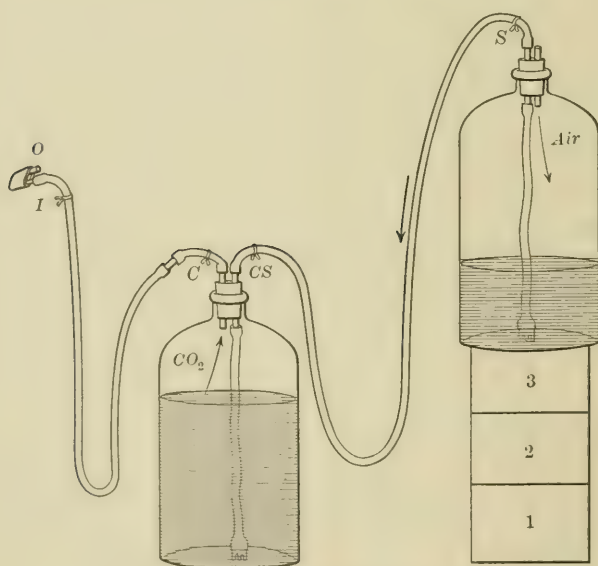


FIG. 7.—Position toward the end of the inhalation.

The rate of delivery of CO₂ for inhalation can be regulated to a nicety by using a screw-clip at *C* or at *I*. By using a mouth-piece of small caliber, all risk of inhaling a large dose is obviated. The mouth-piece depicted at *O* consists of a short and broad open tube (*O*) to insure the continuity of an abundant supply of air, and of a narrow tube *I* con-

nected with the gas bottle. An assortment of small tubes of different caliber would enable us to administer almost any proportion of the pure gas in conjunction with air. The physiological estimate now current admits the general innocuity of a mixture of 6 per cent. CO₂ with air, for temporary inhalation, or of even more than 6 per cent. if oxygen be added. As a fact much higher percentages than this are inhaled for considerable periods, and harmlessly as it would seem, by those exposed in the course of their avocations to higher concentrations of the gas. Provisionally we may confidently adopt 6 per cent. as the maximum limit for our short therapeutic sittings. We shall therefore have to arrange that the strength of the inhalation shall not possibly exceed that limit, and that it shall remain amply below it. The other aspect of safety relates to the total amount permitted to be inhaled. Here our method is on safe ground; the supply itself is limited.

THE SIMULTANEOUS INHALATION OF O AND CO₂. The first instance of this combination having been used was probably that described in my¹ paper of 1898, in which the two gases were inhaled from *separate* supplies, oxygen being used for the purpose of guarding against any ill effect from the CO₂ inhalation in splenic leukocythemia. The mouth-piece is a simplification, but the method is the same. Since then the joint use of the two gases has recently been advocated for the same purpose of Professor Yandell Henderson as a systematic method of rescue, and also as a preventive method against the risks of surgical anesthesia, the active agent of rescue being the CO₂, and the protecting adjuvant the oxygen.

The CO₂ and O Tank. With that object in view, Henderson has now devised for emergency use in the operating theatre a tank containing a mixture of the two gases of definite strength. This convenience would not, however, be available in every-day practice. But our apparatus lends itself with ease to the same purpose, with the special advantage that we can arrange at our choice the proportions of the gaseous mixture by marking off beforehand on the bottle (or on a series of bottles) the desired volumes, and then supplying the gases from the CO₂ siphon and from the oxygen supply respectively. For this purpose it would have been a convenience to have had a "siphon supply" for the oxygen, but this is so little soluble in water (8 per cent. only; at 10 atmospheres 1 volume water dissolving 0.49 only of O, but 16 volumes CO₂) that oxygenated water siphons are of no use to us. With this mixed charge the inhalation becomes a single-tube inhalation, and the larger tube may be used instead of the smaller one, or, if necessary, a much wider tube may be substituted for the mouth-piece.

¹ British Medical Journal, vol. ii, p. 235.

In conclusion, it will be seen that the same apparatus is capable of being used at choice for the separate administration of CO_2 + air, or of oxygen + air, both in known proportions, or of CO_2 + O + air, and likewise for the joint administration of oxygen and carbon dioxide in measured quantities, which Henderson so strongly advocates as a cure and as a preventive for surgical shock, and for the risks of anesthesia, but which is likely to find much more varied applications in our medical therapeutics.

A CARBON DIOXIDE BATH is now available, apart from the mineral constituents of the Nauheim waters, in a form adaptable in any bathroom. The "non plus ultra" apparatus invented by Dr. Edward Paschka,¹ of Vienna, will be easily understood from Fig. 8.

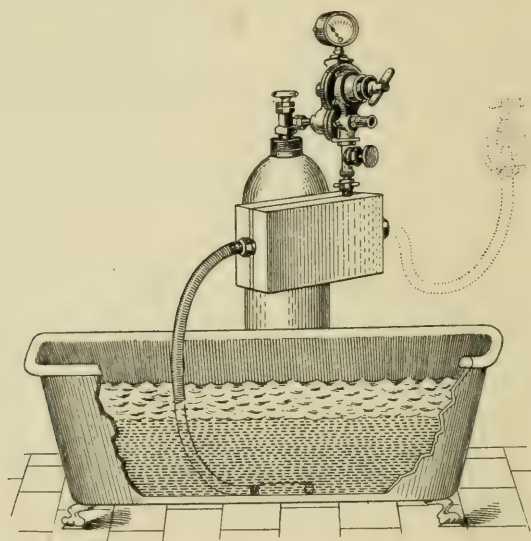


FIG. 8

The box attached to the CO_2 cylinder is the means of so intimately mixing the gas with the water from the tap so completely that the gaseous charge is hardly reduced after one hour's standing and is still perceptible after twenty-four hours' exposure. It contains mixing tubes charged with sharp aluminum shavings through which the water and the gas are conducted, the water having been previously atomized by means of its own pressure to favor rapid gaseous saturation. The gas pressure is manometrically adapted by the regulator attached to the cylinder. A pure gaseous bath can thus be obtained free from any added chemicals. The Nauheim or any other natural mineral water salts can be added at will, while the degree of effervescence should be capable of accurate regulation.

¹ New York Medical Journal, 1912, p. 257.

THE HEART

Recent Cardiac Research. An editorial in the *Medical Magazine* for November takes note of the impetus given to cardiac study by the demonstration of the auriculoventricular bundle, and by the recognition of auricular fibrillation, thanks to the polygraph and to the electrocardiograph. At the same time it suggests that there is just a danger lest their importance be overrated; the details are novel, the clinical conditions the same as we had long known them. In particular, failure of the auricles is not to be regarded as an isolated event; it implies more or less failure of the entire organ. Muscular fibrillation is but a pathological result of muscular degeneration. That it should be benefited by digitalis is no new discovery. But to regard murmurs as of trifling importance would be grievous error since fibrillation itself is one of the ultimate results they predict. That auricular fibrillation should often be an acute and temporary condition would rather tend to show that the phenomenon is not after all of the supreme importance which some have attributed to it. At any rate, it cannot be said for our recent observations that they have perceptibly modified our practice or our results. No new indications for treatment have emerged so far; and the practitioner must continue to take his cue from the character of the pulse, from the evidence as to valvular efficiency, and from the state of the general circulation.

The Polygraph, the "Bundle," the Electrocardiograph, and Auricular Fibrillation. It is only fair to acknowledge that these discoveries have inaugurated a new era in cardiology. While the extent of their literature and the immaturity of their developments defy our attempting any detailed report, we cannot refrain from noting that our pathological conceptions have already undergone a remarkable transformation which is expressed in the growth of an entirely novel clinical terminology. We are beginning to think and write in terms of "nodal rhythm," of "extra-systoles," and of "heart-block." Plausible explanations are suggested for the mechanism, although scarcely yet for the causation, of previously inscrutable conditions such as asystole, tachycardia, and angina. Above all, the electrocardiogram has revealed to us that the radial pulse does not record with any reliable constancy the contractile events in the heart. "Myocarditis," so loosely used for a few years as a universal cloak for all cardiac failings, is at a discount; and we are striving to spell the mechanism of heart disease in the alphabet of cardiac anatomy and physiology. This is more than a new departure, it is a good start; and if only we could reckon upon keeping up the same pace, the goal of practical results should soon be within sight.

All honor to Mackenzie, to Einthoven, and to Lewis.

Percival Nicholson's¹ New Sphygmomanometer is a simple, compact, accurate, and, at the same time, reasonably inexpensive, blood-pressure apparatus. A long glass tube of small bore is continuous, through a short U-shaped bend, with a large cylindrical glass reservoir partly filled with mercury, into the upper end of which projects a short piece of glass tubing fused into it. To the upper end of this tube there is a short heavy rubber tube attached in turn to a metal piece from which project, first, a metal stop-cock, second, a plain corrugated tube, and third, a projection carrying a needle-valve. Parallel to the long glass tube is a movable 300 mm. scale. To the upper end of the long glass tube is a steel stop-cock securely fastened to the glass. The glass portion is held in place by clamps, and is easily removed. The metal parts are firmly secured to the lid, which, when opened, is held in an upright position. To the metal stop-cock, *D*, is attached a rubber tube,

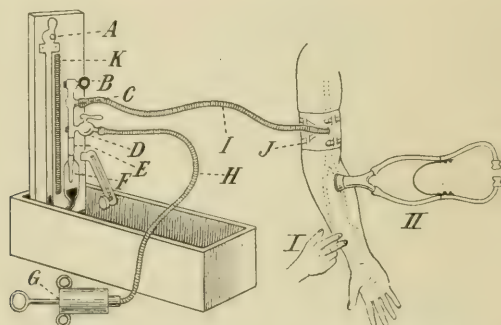


FIG. 9.—A new sphygmomanometer: *A*, steel stop-cock; *B*, needle valve air release; *C*, metal connection to cuff; *D*, stop-cock for tube to pump; *E*, rubber connection to mercury reservoir; *F*, glass reservoir; *G*, metal air pump; *H*, tube to pump; *I*, tube to cuff; *J*, pneumatic cuff; *K*, 300 mm. sliding scale.

along the course of which is a metal valve, and at the end is attached a metal pump. To the corrugated metal connection, *C*, is attached a long rubber tube which runs out to a pneumatic cuff 12 cm. wide and quite rigid. A narrower cuff will give too high readings in normal cases, and too low where the arm is large.

Some of the advantages claimed are: The mercury being entirely contained in glass; the use of a metal pump and metal valve, thus doing away with all rubber bulbs, etc.; the readiness for use by raising the lid and simply turning one stop-cock; no separate parts, screws or nuts to lose, and no mercury to pour. As the box cannot be closed until the steel stop-cock on the end of the tube is shut, there can never be any loss of mercury. The entire glass portion is removable and capable of being cleaned. It is very accurate, thanks to the full 300 mm. scale, and to an adjustable zero point.

¹ Journal of the American Medical Association, July 8, 1911, p. 114.

Arthur J. Bendick's¹ **New Air-Water Sphygmomanometer** is intended to avoid the faults of the mercury manometers and the spring manometers. Its principle is the compression of an enclosed column of air by a few cubic centimeters of water.



FIG. 10

FIG. 10.—Photograph of the complete apparatus, showing tube, stand cuff, rubber tubing, and Politzer air bag which serves as a pump.

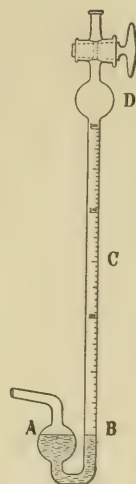


FIG. 11

FIG. 11.—Diagram showing the glass tube of the instrument: *A*, The bulb partly filled with water on which pressure is exerted by a column of air in the tube leading from the cuff; *B*, the level of water in the upright calibrated tube *C*, which contains air above; *D*, bulb in the tube *C* to contain the air as the water rises. At the top of the tube is a cock for closing the tube after the water is put in below.

Its advantages are: (1) Sensitiveness; a few cubic centimeters of water constitute the only moving part; hence there is practically no inertia. (2) Simplicity; air and water constitute the only moving parts. There is nothing to wear out, hence the apparatus is permanent. (3) Accuracy; each manometer is individually calibrated against a mercury manometer.

An Automatic Device for Reading Systolic and Diastolic Blood Pressure is explained by B. R. Hoobler² in the *Medical Record*. The principle is the use of the "double cuff" arrangement in connection with the Fedde pith-ball device. As pulsations pass into the forearm there is at each pulsation slight enlargement of the volume of the forearm.

¹ Journal of the American Medical Association, June 24, 1911, p. 1873.

² December 30, 1911; cf. Journal of the American Medical Association, January 13.

Each enlargement will cause the air to pass from the bag in the cuff about the lower arm, through the tube containing the pith-ball, into the rubber bag connected with it. This will force the pith-ball to move in the direction of the air current; and it will return during the interval. Thus the pulsations in the forearm are recorded by the instant oscillations of the pith-ball, this being the systolic reading.

If the operator opens the shut-off between the upper and lower arm-bags and watches the oscillations of the pith-ball as the air is permitted to escape through a needle valve, the point at which the oscillations are greatest is the place at which the diastolic pressure is read.

Blood Pressure Measured in the Retinal Artery. Rubino and Bajardi,¹ have each suggested a simple determination of the blood pressure based upon the force which is necessary to arrest the circulation in the retina. The ischemia is at once revealed by the inability to see with the eye under pressure. Rubino discusses experiments relating to the anatomical conditions and the modifications of the blood pressure when any of the arteries in the circle of Willis are compressed. By this test he found, in a series of 100 healthy adults, that the pressures ranged from 80 to 112 mm. mercury.

For the Measurement of Venous Blood Pressure. A. Alexander Howell describes, in the *Archives of International Medicine* for February, 1912,² a new method in which a light rubber bag (connected with a water manometer) is bandaged on the upper arm. Another cuff, made of rubber dam (connected also with a water manometer), surrounds the forearm. Air is pumped into the first bag until the veins of the upper arm being obliterated venous congestion is produced in the forearm, and a rise in the water column in the second manometer. The pressure in the first manometer, representing the venous blood pressure, is then read off. It is necessary that the arm be maintained at the level of the heart. The sources of error from the temperature of the air, the thickness of the skin, and the prominence of the superficial veins are not of great importance. The average normal venous pressure by this method proved to be 7.6 cm. of water. In cardiovascular cases, the pressure ranged from 7 to 25 cm.

The Graphic Registration of Heart Sounds. H. Gerhartz's³ tracings and also his bibliography are a valuable contribution. His elaborate apparatus collects the vibrations on the membrane of a cone isolated from the thoracic solid vibrations by avoiding actual contact, and reflects them on a rotating sensitive film as pencils of light from a minute mirror connected with the membrane. The tiny waves of the

¹ *Rif. Med.*, December 4, 1911; cf. *Journal of the American Medical Association*, January 13, 1912, p. 54.

² Cf. *New York Medical Journal*, April 13, p. 771.

³ J. Springer, Berlin, 1911.

sounds are magnified into a tracing perceptibly analogous to the cardiogram of the apex beat, and affording valuable indications in abnormality of sounds and in murmurs.

Lilienstein's Cardiophone¹ is another attempt to improve the auscultatory appreciation of heart sound and particularly the differentiation of valvular and pericardial adventitious sounds. Its principle may be gathered from Fig. 12. It is essentially a "microphone" stethoscope which combines portability with a higher degree of sensitiveness, it is claimed, than has hitherto been obtained.

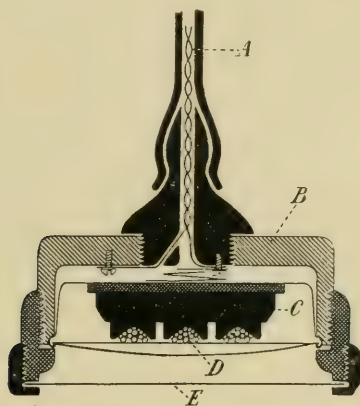


FIG. 12.—Lilienstein's cardiophone: *a*, Electric wiring; *b*, enclosed capsule; *c*, carbon; *d*, carbon membrane; *e*, hard rubber or celluloid membrane.

The Knee-Chest Posture in Diagnosis and Treatment. This posture sometimes assumed for relief in pericardial effusion, does not exclusively belong to that affection. Cheinisse² observed it in a patient of his with duodenal ulcer, a lesion sometimes accompanied by a reflex dyspnea simulating that of pericarditis. Abdominal and pelvic conditions are benefited by it, in particular that known as "arteriomesenteric duodenal occlusion."

PHYSICAL SIGNS

The Genesis of the Dicrotism in the Pulse Wave. D. W. Samways,³ of Mentone, reverts to his previous study (in 1894) of the causation of this elastic oscillation, in connection with the more recent view propounded in James Mackenzie's "Diseases of the Heart," 1910. Mackenzie's explanation is as follows: "As soon as the aortic pressure rises above the ventricular, the valves close. At the moment this happens, the valves are supported by the hard contracted ventricular walls.

¹ Münch. med. Woch., July 18, 1911.

² Sem. Méd., May 15, 1911.

³ British Medical Journal, 1912, vol. i, p. 774.

The withdrawal of the support by the sudden relaxation of these walls will tend to produce a negative pressure wave in the arterial system. But this negative wave is stopped by the sudden stretching of the aortic valves, which, on losing their firm support, have now themselves to bear the resistance of the arterial pressure. This sudden checking of the negative wave starts a second positive wave, which is propagated through the arterial system as the dicrotic wave."

As to the support afforded to the valves by the underlying muscle in systole there can be no question. For twenty years Samways has maintained that the auricles, especially in mitral stenosis, may perform that service for the auriculo-ventricular valves. But he regards any theory demanding so great and sudden a strain of these delicate structures as incorrect. His view is that the dicrotic wave is a "ballistic" or catapult wave, due to the *longitudinal* recoil of the first part of the aorta, after it has been longitudinally stretched by the contracting heart. "During systole the apex does not rise because the arch of the aorta and the lower wall of the ventricle are mutually repelled by the pressure of the blood column lying between them and thrusting them apart. In the aorta, just as the circular recoil drives the main pulse wave onward through the arteries, so the longitudinal recoil, which follows closely on it, shoots on a second wave, the dicrotic or ballistic wave. It might be objected that the longitudinal and circular recoil of the aorta would combine to generate the main pulse wave. That would only be true if the longitudinal recoil were as powerful, and so could commence simultaneously with the circular. This does not appear to be the case. Its mode of production can easily be imitated with a model consisting of rubber tubes and pump. If, when the pump is squeezed, it be also pulled to stretch the tube and, after squeezing, allowed to yield to the stretched tube in its recoil, one wave is generated by the pump and a second smaller one by the tube in its longitudinal recoil. The whole, properly recorded, exactly resembles the main features of a normal pulse tracing, with the dicrotic wave small or large according to the rapidity of recoil allowed."

A confirmatory experiment was performed on a large dog. After anesthetizing it, the chest wall and pericardium were opened. A tube introduced into a main artery of the leg allowed the pulse tracings to be recorded graphically. The aortic walls close to the heart were then seized and held by two pairs of forceps, and prevented as far as possible from making any movement in a longitudinal direction. The dicrotic wave, which before was conspicuous, immediately disappeared, and reappeared at once on the tracings when the aorta was set free to perform its longitudinal movements.

It is perhaps to be objected to Samways' schema that it is a somewhat coarse imitation of the delicate systolic pump, and to his experiment that it probably interferes with other mechanisms of the aorta

besides that of its "longitudinal" stretch and recoil, and also with some of the cardiac mechanisms.

Savory's original account has been confirmed by my own unpublished observations upon the systolic and diastolic attitudes of the septum. The upper ledge of the septum is so directed and shaped at the height of its systole that it bears the weight of the aortic blood column transmitted through the delicate semilunar membrane. Moreover, concerning Mackenzie's explanation, we must hold as a "mechanical" postulate that the filmy semilunar cusps cannot be conceived as undergoing any material variation, because this would be destructive, in their "top" and "bottom" pressures. When the "fluid" pressure in the ventricle ceases, its support has to be replaced by the "solid" support of the ledge of the septum which, by its systolic *leftward bulging*, squeezes the last blood out of the aortic vestibule and occupies its space. These must clearly be the latest of the fibers to contract (and also subsequently the latest to relax in diastole), seeing that the blood is being moved from apex to base, and that the propelling peristalsis, and also its equally rapid relaxation must begin "from below." It is part of the postulate to assume that the solid support of the septum cannot be withdrawn from the cusps before the next ventricular blood charge restores to them their fluid support. There could be therefore no "check to the negative wave of aortic pressure" offered independently by the cusps themselves; although this might conceivably be transmitted through them by some movement occurring in the mechanisms of the aortic ring.

The Genesis of the Venous Pulse. The hypothesis advanced by Samways,¹ that the *a* wave in the jugular pulse is caused by the sphinctering action of the superior vena cava has met with considerable objection.² H. Walter Vernon says: "If it be a percussion wave due to the sudden arrest of the blood column in its passage downward, it would be greater when the body is in the upright position than when in the recumbent, because then the stream is swifter. But this is not the case, the converse holding good. In clinical practice, the *a* wave becomes fully apparent only when the patient assumes the horizontal posture. Moreover, if the acclivity of the *a* wave in the tracing be caused by a sudden arrest in the momentum of the moving column, it would be steep, resembling the upstroke of the radial pulse, and the declivity formed by the drop in the venous column, when the tube is thrown open, would be equally precipitous. On the contrary, the pen in tracing the rise of the *a* wave period occupies as long as a tenth of a second, and an equal time is spent in recording its fall."

K. Douglas Wilkinson³ also remarks that, in the normal patient, the *a* wave is much more prominent in the horizontal position; if

¹ British Medical Journal, April 13, 1912.

² Ibid., May 4.

³ Ibid.

Samways' explanation were true, the wave ought to be greater in the vertical position, for then the inertia of the column of blood in the vein is augmented by the effects of gravity. Again, in cases in which auricle and ventricle are dissociated, the *a* waves, wherever they occur, are of the same shape, but where the auricular systole has occurred during ventricular systole, a much greater *a* wave results. The inference is that the *a* wave is due (in part, if not entirely) to regurgitation of blood from the auricle during systole; for when, owing to ventricular systole, the auricle cannot empty itself normally, it empties itself into the jugular vein more completely than usual, producing a wave of the normal shape, but larger than normal. Samways "can scarcely conceive that most people in good health have a regurgitation from the auricle into the jugular vein:" yet we know that the functional activity of the auricle is not essential to health.

The Minerbi "Aortic Arch Sign" and "Azygos Sign." This is a new departure in the growing subject of dorsal percussion; it is also important because it claims to reach the azygos vein hitherto inaccessible to any of our methods of examination, and, lastly, because it is a praiseworthy attempt to further differentiate the "Retrovascular Dulness" and the "Lozenge-shaped Upper Interscapular dulness" my description of which, in 1899, and recently before the Royal Society of Medicine, in 1910, appears to have remained unknown to the authors, Cesare and Giacomo Minerbi of Ferrara.¹ As it is desirable that the propositions which they advance should be thoroughly tested by many observers, it is essential that that should be reported in adequate detail.

The following conclusions appended to their paper contain a clear statement of the whole matter. (1) Any sound normal subject presents an hitherto undescribed *area of subresonant dulness* situated immediately to the *left* of the middle line at about the level of the third dorsal spine. Its shape is roughly square with rounded angles, and its measurement about $3\frac{1}{2}$ cm. (2) Anatomical, clinical, and radioscopical examinations enable us to attribute it to that section of the aortic arch which issues from the left vertebra-mediastinal fascia and which might be termed the *left summit* of the arch. (3) That area of dulness undergoes certain *physiological alterations* under the influence of a deep inspiration, namely, an *increase in its transverse diameter* connected with the dilatation of the aortic caliber due to the inspiratory increase in the negative pressure of the mediastinum, and a *displacement downward* induced by the descent of the diaphragm. This displacement is partly disguised, only, however, at the upper level, by the upward shifting of the dorsal integument which can be shown to accompany any deep inspiration. It is probable that some fractional proportion of the lateral extension of the patch may be contributed by an analogous inspiratory increase

¹ Riv. Crit. di Clin. Med., 1911, Nos. 50 and 51; and in pamphlet form, Firenze, 1911.

in the caliber of the trachea under negative pressure. (4) Evidence may also be obtained, although by no means constantly, of a physiological variation in size under the influence of Abrams' aortic reflex of contraction. (5) *The pathological* alterations of this aortic subresonant dull patch are of two kinds. Its size and its shape are directly influenced by any morbid dilatation of the arch, and also indirectly, inasmuch as any loss of elasticity of the aortic wall (as in arteriosclerosis) will interfere with the occurrence of its normal inspiratory excursion. (6) *On the right side* of the middle line, in all normal subjects, a deep inspiration will occasion at about the same level a limited subresonant dulness of less distinct outline, which merges at the middle line with the aortic area. This is brought about by the inspiratory turgescence of the *arch of the vena azygos major*. (7) In pathological conditions, this *azygos dulness* is apt to occur even during tranquil respiration. Moreover, it is capable of considerable increase in size and alteration in shape in all cases of stasis in the superior vena cava. It is of constant occurrence in cardiac defects with loss of compensation, and almost invariably in mitral defects when imperfectly compensated. (8) In old age, a limited azygos dulness may be identified even during tranquil breathing. (9) Pathologically, too, the same area is susceptible, although less markedly than the aortic, of a lateral increase and of a total depression under the influence of deep inspiration. (10) A careful examination of these two areas can furnish valuable data for the differential diagnosis of tuberculosis of the pulmonary apex, of dilatations and arteriosclerosis of the aortic arch, of Graves' disease, of cardiovenous defects, of anatomical alterations of the myocardium, of esophageal carcinoma, of peribronchial adenopathy, of mediastinitis, and of pneumothorax and its varieties.

As Regards the Technique there is no mention of the pleximeter or of any special style of finger percussion. It is laid down as essential that when the patient is to be percussed on the left side, he should grasp his left shoulder, and *vice versa*, in order to exclude any contraction of the adductors or elevators of the scapula. Some introductory reference is made to the literature of "spinal" and of "paraspinal" or vertebral percussion. In connection with both of them, it is admitted that the note elicited is a resultant of the algebraical sum of the sonorous vibrations conveyed to individual vertebra by contact with neighboring organs, the intervertebral disks acting as insulators. With special reference to the separate percussion of the spinous processes, it is pointed out that different values are obtained according to the strength of the stroke. This accounts for the divergent descriptions reported. Some observers deal with the spinal series as a whole, and describe it as resonant under forcible percussion. Others discriminate between its individual units, and by suitable lighter percussions are able to detect considerable differences between them. The authors

take the view that it would be misleading to attempt a reasoned analysis of these percussions.

Practically, they dismiss any further consideration of the spinous and the vertebral factor in percussion; and they concentrate their description upon the dulness itself on the one hand, and, on the other

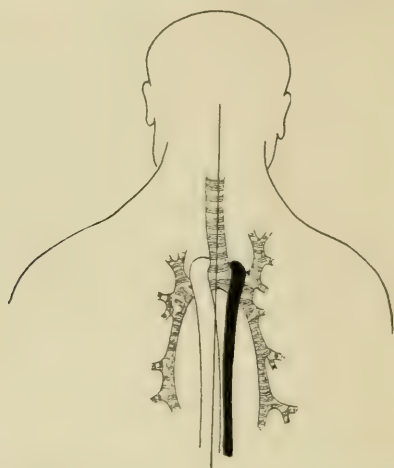


FIG. 13.—Relations of aorta and azygos with trachea.

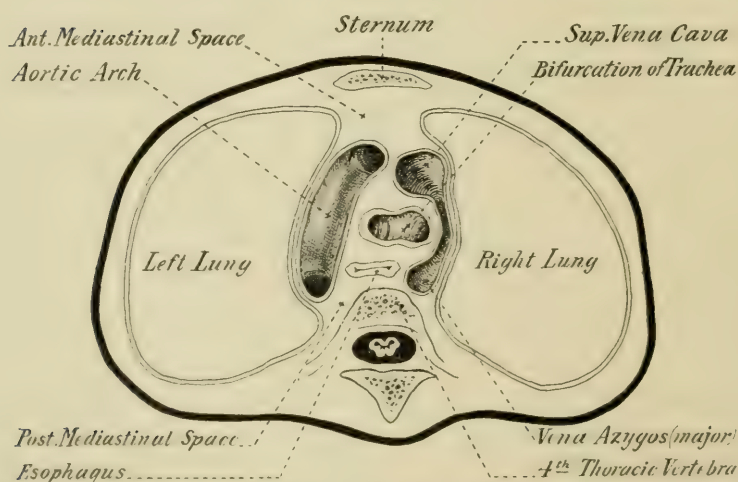


FIG. 14.—Schema of a transverse section of the thorax at the level of the fourth dorsal vertebra. (After Doyen, Bouchon, Spalteholz, and Testut.)

upon its assumed derivation from the great vessels in contact with the upper dorsal spine, and particularly from the aorta. Their diagram of a horizontal section through the fourth dorsal vertebra (according to Doyen, Bouchon, Spalteholz, and Testut) gives a general view of the intrathoracic level which they are studying.

In regard to the aortic arch, radioscopy furnishes them with an anatomical basis with which they believe their percussion results to be in strict concordance. Their radioscopic datum is the convex shadow of the arch which projects leftward from the dark mediastino-vertebral mass. It is to this left segment of the arch that they give the name of "left aortic culmination," and that they attribute the dulness which they describe. They state that its precise vertebral level must vary with the varying degrees of curvature in the upper vertebral column. But the variations in the diameter of their dull area bear no relation to stature or conformation. The average measurements of their aortic-arch patch, which is the centre piece in their investigation, are about 4 cm. in the transverse and 3.5 cm. in the vertebral diameter. Its outline, depicted in Fig. 15, is described as square with rounded

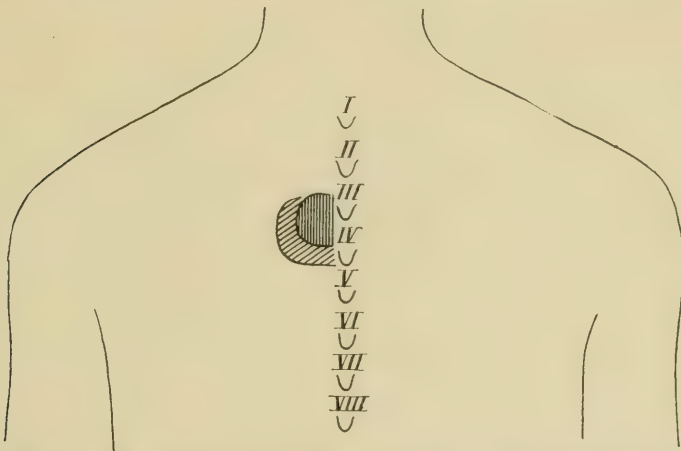


FIG. 15.—The physiological aortic area during a quiet and during a deep respiration.

angles. But the outline and the measurement are both modified by deep inspiration, the influence of which they proceed to analyze in relation to the skin, to the great vessels, and to the heart.

(1) Dermographically they find that the skin shifts upward over the projecting spinous processes during deep inspiration. This has to be taken into account. (2) The contents and the caliber of the great vessels increase with the intrathoracic suctional pressure. (3) The heart's descent, due to the contraction of the diaphragm, tends to lower the arch of the aorta.

The Minerbis find, however, that the upper outline does not very perceptibly, while the inferior one is distinctly lowered. They also find that the transverse diameter is notably increased. These inspiratory variations may be regarded as evidence of *elasticity* of the aorta. Abrams' aortic "reflex of contraction" (*Amer. Jour. of the Med. Sci.*,

April 2, 1904), which he obtains by hammering the seventh cervical vertebra with a Wintrich or a Déjérine hammer, is also worth trying; but they have not succeeded in eliciting it invariably; it is a phenomenon of *contractility*. But they do not state the result of his method of eliciting a "reflex aortic dilatation" by striking the last four dorsal spines. They refer, however, to his¹ clinical employment of these methods for the diagnosis and treatment of aneurysm.

Varied Clinical Inferences are grafted by the authors upon their fundamental observation. The *pulmonary question* is mentioned, though not discussed. Its importance is sufficiently indicated by the close vicinity of the pulmonary apex; the area in question is indeed part of Landouzy's "zone d'alarme" in suspected tuberculosis.

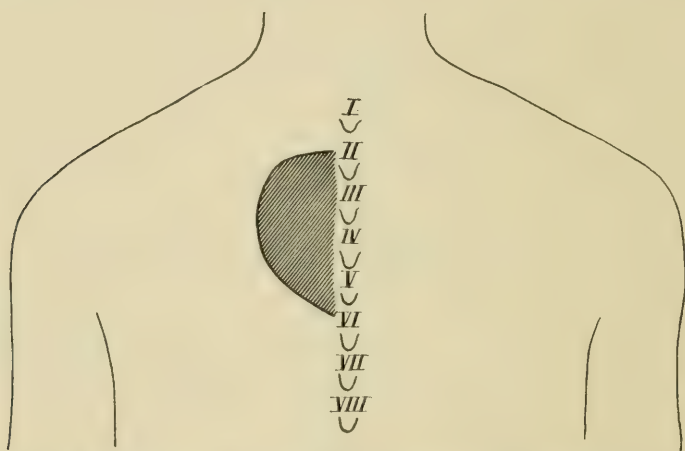


FIG. 16.—V. E., aged sixty years. Aortic aneurysm with presence of a small pulsating swelling in the left subclavicular region and absence of the venous area.

(a) The diagnosis of *aortic dilatation and aneurysm* claims their first attention. The physiological inspiratory variation which they have recognized in their subresonant area is a reservation to their full acceptance of Abrams' rule that a positive response to his tests is suggestive of aneurysm. Dilatation of the aorta would increase its dorsal thoracic contact, and by opening up the arch would widen, and would elongate downward the familiar knob-like projection seen in normal radiograms, and this result is displayed in Fig. 16. *Aneurysm* of the arch would *a fortiori* lead to this outward and downward extension of the dulness. Mention is made too of an upward extension verified *post mortem* in a case where the origin of the left subclavian artery was involved in the aneurysmal dilatation.

(b) The inspiratory dilatability of a diseased or dilated aorta would naturally be reduced by its loss of elasticity. This leads them to expect

¹ Presse Méd., 1911, No. 79.

that a relative loss of the "lateral" inspiratory excursion of the dullness might become a valuable physical sign for the diagnosis of an arterio-sclerotic affection of the arch. Moreover, as in such a case the inferior margin would still be lowered by inspiration, its diagnosis might be differentiated from that of a mediastinitis.

THE RIGHT UPPER PARASPINAL DULNESS AND THE MINERBI AZYGOS SIGN. As stated, on deep inspiration a smaller area of subresonant dullness is described as arising in normal non-aged subjects on the right side of the middle line, at the level of the third dorsal spine (Fig. 17). In their endeavor to identify it with the dulling influence of the vena azygos major, they briefly discuss the anatomical relations of its arch which corresponds to the level of the fourth dorsal vertebra, and, as seen in their diagram (Fig. 17), leaves the spine to curve over the right

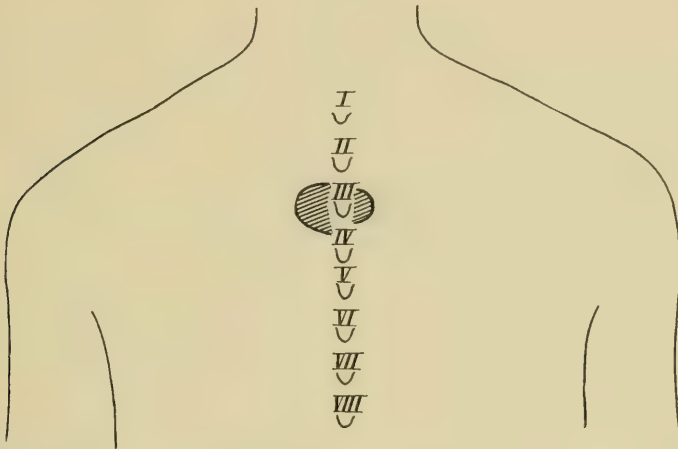


FIG. 17.—D. M., aged eighteen years. The two areas in a profound respiration in a normal individual.

bronchus. During tranquil respiration, in those of moderate age, its projection from the right mediastino-vertebral fascia is not such as to convey any definite dullness to the back; but deep inspiration, which distends it with blood, gives rise to a small paraspinal subresonance with indistinct outlines. Sometimes, however, even in sound young subjects of "herpetic" temperament, to use an antiquated expression, with telangiectasis of the cheeks, it may be traced during ordinary breathing. The pathological conditions which lead to its enlargement and easier recognition are mainly those of congestion of the right auricle and of its great veins.

1. *The Effect of Central Venous Stasis* is to increase its diameters almost to an equality with those of the aortic patch and to produce a bilateral ellipsoid figure with a horizontal long axis. There is still,

however, a difference in the two upper levels as the azygos arch rises only to the fourth, and the aortic to the third vertebra (Fig. 19).

Its characteristic feature is revealed in the more extreme cases where the swelling of the vein itself is credited with a downward extension of the dulness as shown in their percussion results (Fig. 20) in a woman,

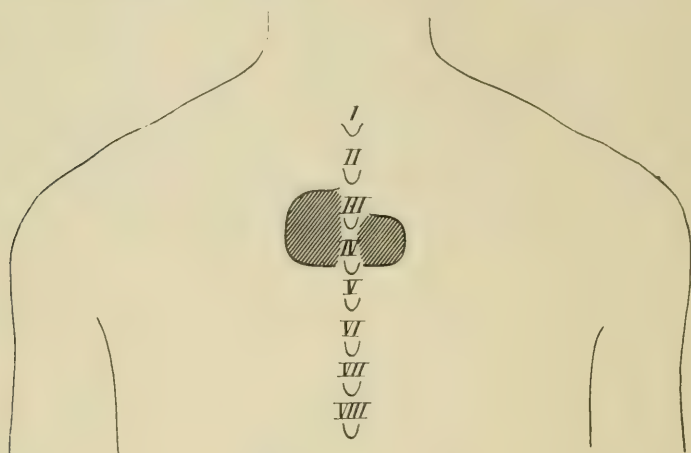


FIG. 18.—V. I., aged sixty-eight years. Arteriosclerosis, mitral defect; compensation of slight extent.

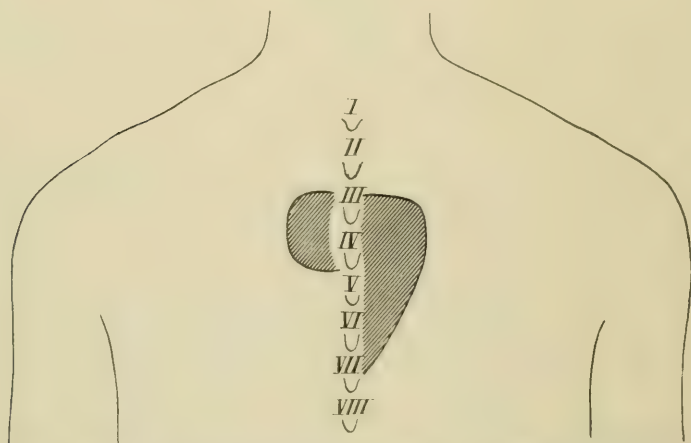


FIG. 19.—P. A., aged forty-one years. Marked cardiac compensation.

aged forty-one years, with aortic regurgitation. The enlarged and tailed area took the shape of a long paraspinal rectangular triangle with its apex pointing downward. Owing to considerable clinical improvement after seven days of treatment, the tail completely disappeared. This is in its most striking development the "segno dell' azygos" or *azygos sign*, the minor degree of which is a simple amplifi-

cation of the small normal upper paraspinal patch, almost invariably observable in mitral regurgitation even when still perfectly compensated, owing to the permanent venous turgor.

This sign provides them with an objective "differential" between the bruits of simple anemia and of venous cardiac defect, a subject which they intend to discuss on a future occasion. It might also differentiate between simple cardiac neurosis and larval Graves' disease ("morbo di Flaiani") in which Grocco has described a rapid dilatation of the right ventricle, with tricuspid reflux, which may be obvious or can be easily induced by slightly fatiguing the patient. In cases of this sort, they discover a remarkable correspondence between the size and function of the right cavities and the evolution of their "azygos patch." At the same time due regard is taken that chronic pulmonary

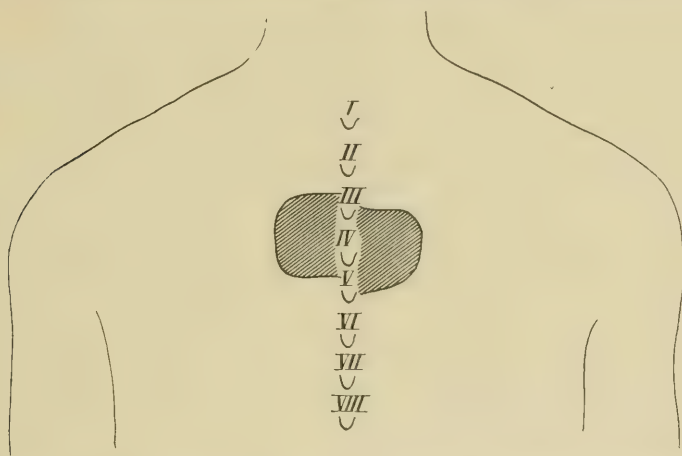


FIG. 20.—P. A., aged forty-one years. Seven days after Fig. 19: Aortic insufficiency; mitral insufficiency.

induration, pulmonary infarcts, or thickenings of the pleura must render the outline indistinct. Functional conditions may be productive of the sign. It was present in a female, aged twenty-three years, with dropped beat (*faux pas du cœur*) and in an alcoholic chauffeur, aged twenty-five years, whose ample azygos area was attributable to a functional affection of the myocardium, of an infective and toxic origin.

(b) *The Inspiratory Dilatability* of the azygos is bound to decrease in proportion to its distention. This is borne out by the limitation of the downward extension of the dull area.

(c) *The Tracheal Factor* is discussed at considerable length, but exclusively from the mechanical aspect of the variations in caliber, without any definite reference to its influence as a source of resonance rather than of dulness. As a hollow organ endowed with elasticity and

contractility, it must be subject to the variations of the intrathoracic pressure; but in the aged its range of passive response to them might be limited by calcification. Part of the limiting effect of inspiration upon the size of the aortic patch might, they think, be attributable to this circumstance, and the effect upon the azygos would vary with the degree of the congestive tension of the venous parietes. These reciprocating forces are capable of a mathematical expression; and a footnote is devoted to the elaboration of a mathematical formula for their calculation.

2. *The Influence of Age* tells upon the azygos, and, in the first place, (a) upon the size and shape of its dulness, the tendency being to a progressive dilatation of the vessel. This reservation must therefore be made that it is only in younger subjects that any important circulatory disturbance could be argued from any moderate increase in the azygos area. In 50 per cent. of the hospital patients past sixty years of age, the azygos dulness was obtainable even during tranquil breathing. (b) *The inspiratory response* as regards the mobility of the outline of dulness is also much reduced by age.

The last section of the paper is concerned with the study of the *extrinsic pathological factors* apt to modify the aortic and the azygos dulness irrespective of the vessels themselves.

1. MEDIASTINAL NEOPLASMS AND THEIR INFLUENCE UPON VERTEBRAL PERCUSSION results have been discussed by Da Costa and by Stradiotti, and, in particular, esophageal carcinoma. The latter avers that percussion, whether moderate or heavy, can detect a loss of resonance at the level of the fourth dorsal vertebra; but he contends that, owing to sacculation above the stricture, a greater intensity of dulness may be identified above that level after the patient has been fed with soup. They have been able to verify this, but not in every instance. Sometimes Stradiotti's test has failed. *Aneurysm* is, of course, apt to increase the aortic dulness in any or all of its diameters. When the two main tests are applied, it is found that one of them, that of inspiratory dilatation, is invariable in its operation. Abrams' test of reflex contractility has not given them the same constant results. *Multiple lymphatic adenopathies*. Obviously their interference is likely to be various and often considerable as regards the outline and its inspiratory variations. In the tracing (Fig. 21) from a woman, aged forty-six years, suffering from chronic lymphatic leukemia the asterisk indicates the only situation in which deep inspiration, as well as Abrams' reflex, produced any effect.

2. MEDIASTITIS, by its fibrous adhesions, is most likely to interfere with the vertical traction exercised by the diaphragm upon the aorta, and they believe that the loss of the inspiratory descent of the lower margin of dulness may prove to be a useful diagnostic asset.

3. PNEUMOTHORAX introduces formidable factors of interference. The working effect of the inspiratory effort must be widely different in its three varieties, "closed," "open," and "valvular." In a case of Forlanini's artificial pneumothorax, they were able to obtain an approximative definition of the aortic area, and also its inspiratory downward excursion. Of the "open" variety it is enough to say that we cannot expect it to yield any evidence of inspiratory aortic variation. In the "valvular" form, the effective force of the inspiratory effort, though not absolutely abolished, is considerably reduced, and our tests are only worth applying on the sound side.

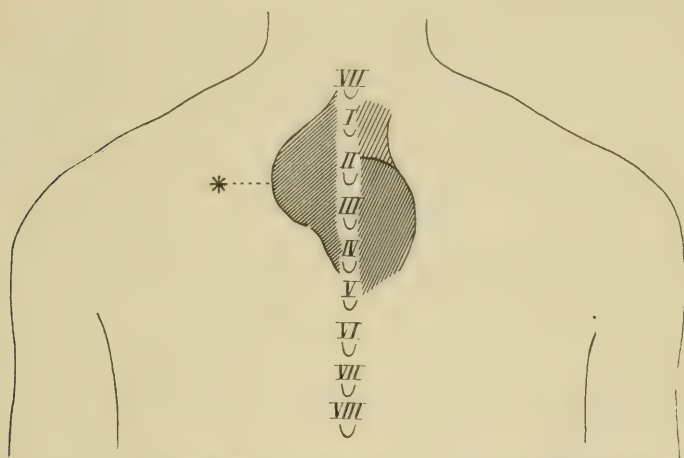


FIG. 21.—D. G., aged six and one-half years. At this level (*) only inspiratory dilatation and Abrams' reflex could be identified.

Lastly, a Useful Practical Suggestion deserves special mention. Whenever, in a tubercular case of left pneumothorax, a marked inspiratory extension of the aortic area is invariably obtained on repeated examination, we have objective proof that the pulmonary perforation has undergone cicatrization. The author's summing-up has already been given at the beginning of this review.

In conclusion, it is hardly necessary to point out that the clinical scope of utility contemplated by the Minerbis for their upper dorsal percussion is varied, deep reaching, and of much importance. The greater therefore our need for an unassailable technique as a basis and for a guarded attitude toward its findings. In their highly original study there are two aspects—the *facts* as regards the normal and the pathological percussion values, and the *clinical inferences* as to their interpretation and as to the diagnostic use to which they might be put. Clinical verification and criticism are manifestly required, and for that purpose it was essential that their case should be fairly and fully

stated. Having done so, we may for the present leave the matter to its fate at the hands of the clinical test of experience.

The "Impure" First Sound. The expression has been objected to as inapplicable to a sound, and also, and this is a more important objection, as an encouragement to inaccuracy in observation. Its justification is that, in a large group of cases, it is the means of identifying a genuine uncertainty in the acoustic evidence furnished by the heart under auscultation. The term may be ill-chosen, and a better one may be found. It has, at any rate, this merit that it connotes that uncertainty without introducing any assumption as to the nature of the cardiac abnormality or as to the mechanism of the perversion of the cardiac sound. It fulfils the essential office of a label which refers the case for closer investigation. The matter may be trivial or it may be important. That is the question which it is our duty to decide. In many instances it will be found to possess no serious significance. In others, judged from the clinical context, it is decidedly ominous. That is the group to which Norman Roberts calls our attention in a letter to the editor of the *New York Medical Journal* (September 30, 1911, p. 708). The introduction to his "Note on the Impure First Sound at the Cardiac Apex" defines the subject under discussion.

"In your issue of April 22, 1911, Dr. Selian Neuhof discusses 'the impure first sound at the cardiac apex,' following a variety of severe systemic affections which during their height showed signs of acute cardiac dilatation and incompetency; the only indication, after recovery, of the recent extreme demoralization of the heart being nothing more than a diffuseness (slight or marked) of the natural sharpness and definition of the first apical sound; a so-called 'split' first sound a bare impurity, a lack of distinctness of the first sound; or a faint, scarcely discernible, soft, blowing whiff or murmur, accompanying or partly replacing the beginning of the apical systole. This murmur or whiff is not transmitted, is never loud or rasping, and is at times only noticeable after sharp exercise."

He proceeds to give his own experience, in the examination of a large number of men supposedly sound, in one of the United States Government Services. The work of these men necessitates irregular spells of exposure and overexertion, to and sometimes beyond the limit of human endurance; in the intervals they underexercise and overfeed. The "impure first sound," occurring among these men, grades insensibly into apparently entire normality of the heart, on the one hand, and, on the other, into orthodox and unmistakable valvular heart disease the cases of which increase progressively in numbers and in severity with age and length of service. The effects of an exhausting intoxicating disease are analogous, and the remote effects on the heart are nearly identical. "More than once, I have come into sharp disagreement with a private medical attendant basing his opinion on

the slightrness or inconstancy of the murmur, or the absence of transmission, or of dilatation, or other sign of broken or threatened compensation. The fact remains, however, that such hearts constitute a bad risk for underwriter and possessor alike. As the condition progressively approaches that of typical disease, the heart loses its tolerance. An attack of rheumatism may afterward be regarded as the primary cause of the heart trouble by the same kind of reasoning that attributes consumption to catching cold. The treatment of this condition of incipency is the same as that of the fully developed heart disease during compensation—of course with much more prospect of doing good, or even of completely and permanently curing the condition. It must be remembered, however, that in this as in the great bulk of sickness the cause is essentially occupational."

We quite agree with the view taken by Selian Neuhof¹ of the importance of the indication, although an impure sound does not always imply any previous heart trouble. In his paper he gives 8 cases in which severe cardiac symptoms, and dilatations with murmurs, were recovered from, leaving only a faint murmur or an impurity of the first sound. Such patients we also regard as liable to a recurrence of the attack; they should be warned against the risks of overexertion and stresses, and overindulgence in alcohol or tobacco. A faint murmur may perhaps have been diagnosticated; and this, on closer examination, may resolve itself into a mere reduplication of the first sound. Nevertheless, although not strictly speaking a murmur, and although not due to any regurgitation, this peculiarity is sometimes of serious import. If the test by tentative exertion instead of removing the irregularity should render it louder and more distinct, the soundness of such a heart is open to serious suspicion, and the reduplication may prove to be the forerunner of a genuine systolic murmur from mitral insufficiency due to orificial atony.

Tricuspid Regurgitation in Stern's Posture. L. B. Sachs² confirms H. Stern's original observation that this and various other valvular and vascular phenomena are accentuated by lowering the head when in the recumbent posture. It is interesting to note that Landis and Kaufman,³ in their study of the venous hum occurring in most children under fifteen years, find that it tends to disappear in the recumbent position except in anemic subjects.

The Xiphoid Hepatic Venous Hum in Cirrhosis, again noted and recently studied by Henry⁴ and by Thayer, was regarded by Charcot as of favorable import. "Is its disappearance of evil omen?" is the question they ask.

¹ Loc. cit., p. 784.

² Medical Record, February 10, 1912.

³ Cf. Archives of Pediatrics, February, 1912.

⁴ New York Medical Journal, January 27, 1912.

The Fist as a "Standard" for the Size of the Heart, as described by M. Levy Dorn and S. Moller,¹ may become a popular measurement; but it is scarcely "millimetric." Their "heart measure" is $1\frac{1}{2}$ times that across the joints, or the width of the hand plus the length of the first median phalanx.

The Left Paravertebral Hepatic Dulness. Its recognition in 300 cases by Grocco,² although it had previously been mapped out and published in 1899, marks a definite advance in the practical utilization of dorsal "viscerography."

HEART AFFECTIONS

A Case of Congenital Heart-block is reported by J. M. Gill³ in a girl, aged three years, who died suddenly while convalescing from a slight attack of tonsillitis. A striking peculiarity was the low pulse rate and the high rate of respiration, both averaging 50 per minute. Unfortunately, there was no autopsy.

Septic Endocarditis. Having succeeded in identifying the organism in nearly all his 28 cases, G. Jochmann⁴ provided us with a valuable analysis of the clinical features of the various types of ulcerative endocarditis. The "staphylococcus" variety usually traceable to an infected skin as in furuncles or felon, or to a mucous lesion as in "catheter fever," is apt to lead to multiple suppurative metastases, and to be as fatal as the "pneumococcus" endocarditis. "Gonococcus" endocarditis, also grave, is not hopeless in his experience. In the more prevalent variety, due to "streptococci" usually supplied from some mucous lesion, he contrasts the acute hemolytic affection with Schottmüller's "endocarditis lenta" of verdant non-hemolytic growth and insidious articular rheumatic origin, complicated rarely with rigors, but with motor dyspnea, bilious pallor, dry cough, splenic and sometimes hepatic enlargement, sometimes, too, embolisms. Its less rapid course affords an opportunity, which Schottmüller doubted, for vaccine treatment and serotherapy, which he recommends. His treatment of the gonococcal affection with autovaccine, supplemented with injections of 5,000,000 killed gonococci every fifth day, gave definite results in some of his cases, and in one of them a cure.

Heart Failure and its Etiology. Sir Clifford Allbutt's graphic review of this problem is calculated to impress upon us the variety and the importance of its "unknowable" or, at any rate, its unknown quantities. In that connection we may venture a brief comment. The first of these is the quality, good or bad, of the original vital endowment

¹ Zeitsch. f. klin. Med., 1911, vol. lxxii.

² Cf. Ferranini; Rif. Med., June 19, 1911.

³ Australasian Medical Gazette, June, 1911

⁴ Berlin. klin. Woch., March 4, 1912.

expressed in terms of the vigor of the automatic rhythmic contractibility of the heart—the basis of all the heart's growth and of its behavior under its many vicissitudes. The majority of the “inadequate hearts” succumb to the stresses of early life. Those who escape remain only to encounter the mysterious ordeal of the climacteric.

Another set of those “unknowable” factors comes into operation when the nervous system grows into the heart, bringing with it the stimuli and the checks from the psychical cerebral centres and from the visceral medullary centres, thus opening up various approaches of attack upon the heart, and above all upon its vulnerable cardio-respiratory mechanisms.

The pathological degenerations and the toxemias offer unlimited scope for speculation. The versatility of our theories is illustrated by the recent prevalence of the diagnosis of “myocarditis,” which has now been supplanted by that of “heart-block.”

These are the ranges of latent risk for hearts originally weak or weakened. It behooves us, however, not to overlook those risks, much less remote, which are of a mechanical order, and which are both demonstrable and manifestly disturbing to cardiac rhythm, and in particular the gastro-intestinal distentions, as they also interfere with the paired mechanisms of respiration. Moreover, they carry with them toxic and nervous reflex possibilities of evil, as well as the stress of lateral pressure. Gastric distention is often undetected through our forgetting that the crura of the diaphragm fix the fundus to the spine, thus tending to guide its inflations into the left thoracic groove, behind the heart, at the expense of the more squeezable lung; and through our never looking for it in the back where it is to be found. This practical point he has often insisted upon; but it was first published in 1899, in a preliminary note in the *Transactions of the Clinical Society of London*, vol xxxiii, p. 202, “On Gastric Distention Upward and Backward.” Clinical experience of its frequency and of its treatment, as a cause of urgent respiratory and cardiac symptoms, has impressed upon him that, although it is only one of many, it is not the least frequent or the least potent of factors in the etiology of unexplained cardiac failure.

Sudden Heart Paralysis in Diphtheria is due mainly, according to T. Tanaka's¹ pathological research, to the “fatty” change. This in some cases does, but in others may not involve the “bundle.”

Left Recurrent Laryngeal Paralysis in Mitral Stenosis. G. Fetterolf and G. Norris² have collected 26 clinical cases, and 11 autopsies of this combination. They are led to the conclusion that any “squeezing” of the nerve must occur between the left pulmonary artery and the

¹ Virchow's Archiv., January, 1912.

² American Journal of the Medical Sciences, May, 1911.

aorta or aortic ligament; but that most probably the nerve destruction leading to paralysis is due to a secondary neuritis.

The Mediastinal Pressure Effects of Mitral Stenosis are discussed at some length by M. Effendi,¹ and in particular recurrent laryngeal paralysis, and inequality of the radial pulses. These may be observed simultaneously in the same patient. In one of his cases, two days' treatment with digitalis cured the hoarseness but not the almost complete impalpability of the left radial—the mechanical causation of which is not yet explained; on the right side this symptom is due, according to Popoff, to the pressure of a distended superior vena cava and innominate vein.

Paroxysmal Tachycardia. Hering's view is that the type may be either auricular or atrioventricular. Some cases have long been considered as of nervous origin, and this has been substantiated by experiments; these also bear out the inference that the stimulations which excite the "heterotopic" extrasystoles may themselves be heterotopic.

THE ETIOLOGY, THE PATHOLOGY, AND THE TREATMENT remain alike obscure. We therefore welcome observations contributing absolute evidence bearing upon any one of the aspects of the natural history of the affection. The case concisely reported by Herbert M. Rich² possesses that value, and is best stated in his own words. The only remarks which he appends to the notes are as follows. "The interesting points in the case are: (1) The persistence of the attacks for sixteen years, in a person otherwise well and in a heart without valvular defect. (2) The unusual traumatic origin. (3) The interruption of the nodal rhythm and immediate relief by the deliberate and persistent attempts of the patient to increase her intrathoracic pressure under medical direction."

The patient, a married woman, aged twenty-nine years, recovering from a recent miscarriage and peritonitis, complained of a distressing and painful irregularity of the heart with cardiac tenderness, although she presented no valvular signs or arrhythmia; "but there was an apparent unevenness in the force of the beats, as though the ventricular contraction were incomplete, suggestive of an interference with nervous impulse rather than muscular insufficiency. At the age of thirteen years she had jumped rope until her heart gave out. She was confined to bed at this time and was very sick. At intervals since she has had attacks of rapid heart, or 'palpitation.' These attacks always begin with a 'thud' and she realizes instantly that an 'attack' is on. It ceases as suddenly as it began, and is followed by a momentary faintness, after which the patient is conscious of no after-effects. The duration varies from a few minutes to eight or nine hours. She sometimes wakes out of a sound sleep at night to find her heart racing, while more

¹ Deutsch. med. Woch., October 12, 1911.

² Journal of the American Medical Association, vol. lviii, p. 111.

often it follows some severe exertion. These attacks have now persisted for sixteen years with no essential change. She has a few times noticed that the palpitation would cease after some sudden movement, such as jumping abruptly out of bed. I made a provisional diagnosis of paroxysmal tachycardia. Bearing in mind that the pathology of this condition is a fibrosis of the primitive cardiac tissue, it is not difficult to believe in the possibility of such a traumatic origin as that mentioned.

"On October 29, I saw her in what she called a typical attack. Her pulse was 192, regular, embryocardial, no murmur; patient anxious, skin moist, breath short. She thought this attack was lasting too long; it had already persisted three hours. As soon as I was sure of the condition I suggested trying the postural methods referred to in my previous paper.¹ She was first placed with her head down and instructed to take deep breaths, to hold and to push. This only choked her. After several other positions were tried without success, I advised the patient to continue these efforts at intervals. She sat up in bed to try again, folded her arms tightly across her chest, the right arm passing directly over her heart, leaned forward, took a deep breath, closed her glottis and then compressing her chest with her arms, pushed as hard as possible. Then instantly she looked up and said, 'It has stopped.' Her pulse had now dropped to 96. In two minutes more she was walking about the room, discussing her attack as though it had been weeks before."

In a supplementary note Rich² records similar success in his other patient, Miss C., who has a murmur of mitral stenosis, and is subject to attacks at infrequent intervals, hitherto refractory to the method described. The tachycardia (220 per minute) had begun at 8 A. M. "At 4 P. M., after trying the method several times unsuccessfully, I seated myself in front of the patient. Putting my right hand flat over her heart, and my left on her back directly opposite, I directed her to take a deep breath, close her glottis and fix strongly the walls of her chest. I then squeezed the chest walls with some force, attempting to exert some pressure on the upper part of the heart. Instantly she expressed relief, and I found the pulse to be 110. After resting a few minutes she went home on a street car, perfectly relieved. It seems certain, in this instance, that relief was obtained by direct pressure on the heart itself. If the pathology of the condition is, as Keith found, a fibrosis of the primitive cardiac streak, then the attacks are probably due to an occlusion of one or more bloodvessels with a consequent derangement of the circulation in this highly important tissue. It seems not improbable that a squeeze of the heart at this time might reopen the occluded vessel or vessels and reestablish the normal

¹ Journal of the American Medical Association, 1910, p. 1861.

² Ibid., 1912, p. 550.

circulation with a consequent relief of the dependent phenomena. If this explanation should prove to be the true one, the method would be worth trying in early cases of angina pectoris. The pathology is similar and it seems not unreasonable to believe that an occluded coronary artery might also be opened by squeezing the heart and the anginal attack cut short."

Rich's facts and comments are eminently worthy of consideration, with due reservation as to the "applicability" of the method to angina pectoris. One fact stands out clearly; instant relief was obtained by *strictly mechanical* means, bearing upon the intrathoracic contents and therefore also upon the diaphragm; and this is also the tale of the occasional success of analogous maneuvers, and in particular of spontaneous or induced vomiting, which must tell first and foremost upon the most mobile and yielding structures, namely, the lungs and the diaphragm. The inference is that the causation is likewise mechanical, and most probably connected with certain mechanical irregularities of those organs, visited upon the heart. The other great inference is that the tachycardiac fiber is instantly responsive to intrathoracic pressure variations which are trivial compared to some major accidental thoracic compressions to which the heart's action often remains almost indifferent. That immediate and complete return of normal myocardial function, and the clause "once fibrous, always fibrous" are formidable objections to the fibrosis theory. Nevertheless, we do not overlook the fact that the intra-auricular blood pressure is delicately sensitive to intrathoracic pressure fluctuations; and that the curative, as well as the assumed causative, pressure which has been used may actually reach the endocardial surface of the primitive streak, in its auricular course; but whether in its ventricular course also is much more problematic. But that pressure is modified, and, moreover, it is attenuated by the yielding cushion which transmits it. The direct pressure is chiefly expended in modifying the attitude of the lungs and diaphragm and their "external" pressure upon the heart, and, in short, the inter-organic relations in the matter of intrathoracic space. And this immediate and considerable pressure result clearly must be accounted for first, before we can speculate upon the more remote intracardiac result. The diaphragm, and through it the lung also, are "abdominal" factors as well as thoracic. In our present ignorance, tachycardia must continue to be an abdominal problem as much as a thoracic one. Unfortunately, Rich does not refer to that aspect, and does not give us any clue as to whether the most common of all causes of functional cardiac disturbance, gastro-intestinal inflation and a high diaphragm, were duly eliminated from the clinical and from the etiological complex in his cases.

"**Cardiac Asthma.**" Is there such a thing? If not, why misuse the name? The burden of Sir Clifford Allbutt's¹ criticism, much resented

¹ British Medical Journal, 1911, vol. ii.

by James Mackenzie, was that that expression is a misleading and pathologically indefensible specification. As usual, this paper war has spread far beyond the point of attack which was "the heart," and has led to an exhaustive discussion on "asthma," one of the most instructive of recent years, with the upshot that from John-O-Groats to the Land's End—Ireland gave no report—"asthma" is still a free interpretation; and that the use of the term "cardiac asthma" may still be one of the privileges of that freedom.

In strict nosology, Allbutt's admirably expressed advice is, "not to shuffle our labels in our museum as a cure for our uncertainty as to the true value of our specimens. Classification of disease is conventional; a device to meet the limits of our understandings. Never mind what the label may be; once adopted, let us stick to it and keep it exactly to its place."

THE DIFFERENTIAL DISTINCTION BETWEEN CARDIAC AND ASTHMATIC DYSPNEA is the pivot of the "heart" question. Mackenzie takes his stand upon clinical observations which he claims are largely denied to most of our teachers, seldom called out like the general practitioner to witness the nocturnal drama of orthopnea. This is a rather sweeping postulate, not easily admissible. His pathological interpretation of the outward similarity to asthma which he discovers in those nocturnal seizures is largely inferential, being based upon the assumption that the heart itself is as likely as any other organ to be the seat of the peripheral irritation productive of asthma. On that point it may be remarked that in health the heart's privilege of relative impassiveness is for us a condition of existence under the stresses and shocks of daily life; and that, in disease, even less safely could it afford any hypersensitiveness to stimuli. At the same time, if an asthmatic or one disposed to asthma should develop heart disease, then the term "cardiac asthma" becomes clinically apposite, while the pathological question remains whether the asthmatic seizure eventuates in spite of the cardiac disablement or because of it.

The following points also may be worth noting. The special heart feature noticeable in the ordinary case of confirmed spasmodic asthma is its soundness and endurance. The recurring attacks are usually more damaging to the lungs than to the heart. Indeed, they almost seem to act as a tonic exercise for the left heart. Harry Campbell even suggests—but I cannot quite agree—that they also favor the work of the right heart in proportion to the pulmonary distention. If the heart should ultimately give way, they are not often directly responsible for its failure, but only indirectly through the chronic emphysema which they gradually determine. There is a great contrast between this underlying efficiency of the circulation and its progressive disablement which precedes the onset of so-called "cardiac asthma." In its respiratory aspect, also, this is more of the nature of a climax in

a growing pulmonary embarrassment than of a sudden seizure in which spasm is the only or the central determining agent. The panting inspiratory hyperpnea which is distinctive of purely cardiac dyspnea is based upon its freedom from expiratory obstruction. The need is not so much for oxygen as for carbon dioxide, to regulate the respiration by deepening the shallow expirations. Here, however, there is a spasmodic element undoubtedly present, and undoubtedly related to the main condition, which is cardiac. But the pulmonary congestion of heart disease does not exclude the possible operation of the ordinary factors of asthma, and especially of the gastric and of the bronchitic factors, which are often conspicuous at this stage. We should bear in mind, too, that a comparatively slight degree of bronchiolar spasm might then suffice to act as a last straw in setting up a paroxysm; and the same is true of the asthmatic complications sometimes super-added to the dyspnea of chronic phthisis. These points of difference illustrate the inherent difficulty in any attempt to identify the mechanism of cardiac or of renal asthma with that of genuine nervous spasmodic asthma. But the clinical condition is definite, and as there is for it no name equally convenient and descriptive, we may perhaps be content to continue to secure clinical clearness by still using the old term, with all due pathological reservations.

The paroxysmal nocturnal attacks, in H. Barber's¹ practice, affected invariably elderly non-albuminuric men free from valvular disease, and aneurysm, but with an enlarged heart attributable he believes to myocardial degeneration. This might explain a liability to them; but not quite the recovery from them, which rather suggests to us the interference of gastro-intestinal inflation as a determining factor.

Abdominal Angina. In a joint paper with W. E. Williams, Sir Lauder Brunton² mentions that the term "*angina abdominis*" was first used by Baccelli, and that cases had also been described by Pal and by Huchard. Most of these suffered from tabes. In the extensive continental literature to which Parkes Weber alluded, a variety of names had been given to it, an example of these being "*dyspravia intermittens angiosclerotica intestinalis*," with the substitution of "*gastrica*" for "*intestinalis*" as a variant, when the stomach was believed to be concerned. In the authors' case, the patient suffered from severe pain on taking exertion. It was like that of angina, but was situated in the umbilical region. At first it was attributed to flatulence, but gradually increased both in severity and extent until it spread all over the chest, and caused perspiration to break out over the body. The patient had suffered from glycosuria for twenty-five years. On account of the severity of the pain and of its great likeness to that of angina pectoris, trinitrin was prescribed, with the result that the pains were removed

¹ British Medical Journal, December 16, 1911.

² Royal Society of Medicine, March 26, 1912.

exactly in the same way as if they had been situated in the chest. The sister of the patient had suffered for seven years from a similar pain in the same region; walking sufficed to start it. Her pain also was removed by the taking of trinitrin.

The interest, however, seems to us to be chiefly nosological. The possible tabetic derivation should be borne in mind; but flatulence combined with intestinal spasm is sometimes productive of agonizing pain. This renders the differential diagnosis of an abdominal "vascular crisis" extremely difficult. In the ordinary breast pang, this element of confusion is eliminated; and yet the precise localization of the pain to the heart, to the vessels, to the plexus, or to the thoracic or diaphragmatic muscular fibers has not yet been determined. Are we justified in extending the range of that uncertainty in a direction where it is further complicated and yet more difficult to solve? It would seem more prudent to consolidate our notions of the anginal puzzle by concentrating its study and its definition upon its less doubtful presentments. We are in entire sympathy with the summing up of Frederick Taylor who held to the definition that "angina" means not only pain, but a "suffocating pain," notwithstanding any postmortem evidence such as that reported in an analogous abdominal case by Crookshank at the same meeting. In that instance, the pancreas was found lying loose as a necrotic mass, the pancreatic artery was practically obliterated by arteriosclerosis, and there was extensive arteriosclerosis of the celiac axis, suggesting that the pains were due to angina abdominalis, though he preferred the term "intermittent claudication" for the condition.

Heart Treatment.—MEDICINAL THERAPEUTICS. Fraenkel recommends *strophanthin* for systematic intravenous use when *digitalis* does not answer. F. C. Askenstedt¹ has tested *strychnine*, *atropine*, and *digitalis* as to their power of raising the blood pressure when depressed by disease, and found them wanting. Cushing reminds us that while *digitalis* distinctly benefits auricular fibrillation, it may also, by inducing a pulsus bigeminus, tend to predispose the heart to fibrillate. *Adrenalin* is warmly advocated for cardiac dyspnea and dropsy by J. C. Voigt² as a cardiotonic and diuretic, and by E. F. Coghlan³ in the cardiac failure of diphtheria. In a remarkable case of *prolonged anginal spasm* lasting a whole night where the usual remedies failed, E. H. Coleman⁴ was able to control the spasm by constantly repeated *chloroform inhalations*. Dark colored mucous plugs were expectorated the next day; but the suspicion of pulmonary embolism could not be confirmed by any physical signs. The *cane sugar treatment* (5 oz. daily, continued for six months practically without any drugs) was a complete success in H. Dingles⁵ case of

¹ Lancet-Clinic, January 27, 1912. ² British Medical Journal, March 9, 1912.

³ Ibid.

⁴ Ibid.

⁵ Ibid., January 13, 1912.

confirmed mitral failure and dropsy, pronounced by a "second opinion" to be hopeless. The treatment was well borne, and gave rise to no complications.

The Dietetic Treatment by Karell's Milchkur consists in reducing the exclusive milk supply to 800 or 1000 c.c. for five or six days. This is held up by Hermann¹ as a pattern of the value of "under-feeding" in general therapeutics; and W. His² loudly praises it in the heart failure of obesity, emphysema, valvular disease, cardiac asthma, angina, nephritis, and in rebellious serous effusions.

CARDIOLYSIS. J. Curtillet and G. Pelissier³ find that Brauer's operation has been performed 20 times in Germany, 4 times in France, and 3 times in England. As in their own case, in 15 of the total 27 cases the cardiac trouble was of tubercular origin, and the results were not unsatisfactory.

THE ACTION OF THE NAUHEIM BATHS. In presence of the clinical importance which the researches of the last seven years have identified with the inhalation of carbon dioxide it is surprising to find that the summary of opinions collated by John M. Swan⁴ from the literature on the merits of the baths in chronic heart disease should include no reference to their respiratory value. Schott is credited by him with a belief in a reflex stimulation of the heart from the surface effect on the skin, and in a physiological stimulation of the arterioles and capillaries by a passage of the gas and salts through the skin which Swan cannot concede. If we could cease to trust our integument to be air-tight and water-tight, even then how narrow that way for the gas of which a feeble percentage through the tracheal high road instantly animates the entire cardiorespiratory machine in its depressions. Little wonder that all our recent authorities not impressed with that thought should dwell patronizingly upon the collateral benefits as circumstantial and psychical, in addition to the obvious cutaneous reaction obtainable anywhere by the same balnear procedure. The greatest significance attaches to the late Professor Huchard's practical conclusions. He was so much struck with what he saw at Nauheim, even in so-called "anginal" cases, that he proceeded to organize a Nauheim at Bourbon Lancy after writing as follows: "A single hydromineral station cannot agree with all cardiac subjects. In Germany one has elevated or rather debased Nauheim to the rank of a panacea. This station receives all cardiopathies, it treats the most variable cases; valvular, arterial, or functional disturbances, cases of super-tension as well as cases of subtension, cardiacs and pseudocardiacs; it cures all, angina pectoris, overstrain of the heart, all the arrhythmias, all the tachycardias, all the palpitations; it resolves valvular exudates,

¹ St. Petersburg Med. Z., February 14, 1912.

² Ther. Mon., January, 1912.

³ Lyon Chir., May, 1911.

⁴ New York Medical Journal, October 7, 1911, p. 713.

it retracts the heart, and, although it contains too much chloride, it is sedative, to become excitant or tonic following the needs of the case. I am not the enemy of carbogaseous baths, which ought to render very great service in well-determined cases, but I am the enemy of a systematic medication for all cardiacs, and it is for this reason that several hydromineral stations in France have been instituted to respond to the therapeutical indications of the different cardiopathies."

A gas supply from a simple carbonated-water bottle, as described in this report, is a first step toward a clinical analysis of the mode of operation of the Nauheim bath, which was begun long ago in my paper¹ on the "Prebalnear Treatment" of heart disease and anginoid distress by direct inhalation of carbon dioxide, for patients too ill to leave their bed.

The value of that treatment is so great that attention has been called to its neglect during the last twelve years in the paper referred to on another page, and to their simplest means of supplying the gas in an emergency. Another simple source of supply is the CO₂ "carbonet."

(a) *The Nauheim Method.* In this, taken as a combined "cardio-vascular" treatment, this agency is included, and is sometimes perhaps the most active element in the cure. But all cases are not suited for that cure, as a whole, nor even for the bathing alone. As regards the CO₂ baths, the Nauheim School has laid chief stress upon their circulatory, or left-ventricular value. The "respiratory" treatment has been insisted upon mainly in connection with the respiratory effects of the exercises. Viewed in that light, as left-ventricular and arterial stimulants, the suitability of the baths for arteriosclerosis, aneurysm, and angina has been strenuously contested. As regards arteriosclerosis, I am the less inclined to question the favorable opinion entertained by Nauheim physicians well qualified to judge, as I hold that the balnear treatment is above all a "right-heart treatment," its mechanism chiefly "respiratory," and its advantages nutritional, as well as motor. It benefits first and foremost the cardiopulmonary function, but jointly, too, the cardiovascular as well as the peripheral circulation, by improved oxygenation under the respiratory stimulus of the carbon dioxide which is inhaled. This explains the paradox that Nauheim baths are equally efficient in lowering blood pressure when it is high, and in raising it when it is too low. They supply in their own way the fundamental respiratory indication.

Their suitability in the worst disablements of cardiac disease is a larger question. I have shown that the all essential "cardiopulmonary" benefit could be secured at the most critical stages by dissociating the inhalation of the gas from the exertion of bathing, and also from any exertion whatsoever in bed on the part of the bedridden. Whenever

¹ British Medical Journal, 1899, vol. ii, p. 1178.

indicated, this is, short of venesection, the only immediate and the only direct form of treatment we can exclusively address to the congested lungs and right heart. But it is free from the mechanical complications of the latter, and from its blood depletion; and is therefore capable of wider systematic individual adaptations in its degrees and in its repetitions.

The unique advantage of carbon dioxide inhalations is that, while it is the most efficient of all cardiopulmonary stimuli, it is the only one absolutely independent of the patient's conscious coöperation, and therefore available in combination with oxygen for the most extreme prostration, when everything turns upon the relief of the cardiopulmonary disablement and of the failure of oxygenation.

(b) *The Carbon Dioxide Inhalation Method.* In arteriosclerosis there is no urgency, and the future must decide whether there may be any superior claim for its employment. For the present it cannot even be suggested as indispensable. The fact is all the more striking that this should have been hitherto the only form in which the indispensable respiratory treatment has been systematically provided, apart from exercise. The arteriosclerotics who are bathed at Nauheim or elsewhere get the benefit of it on a large scale, and apparently with good results. But the great majority get no balnear treatment and no separate respiratory treatment whatever. This much may then be said for the method; that it has long been an actuality, and that, although it has never been mentioned even for trial, it has been in daily use for many years as a blessing in disguise. We could not, therefore, omit due reference to the subject; nor forego pointing out that a more scientific, and shall we say prudent technique is an obligation which should not be longer deferred if the practice is to be continued. This remains at present in its rough empirical stage. The next step should be to give it its systematic trial by studying the doses and the best conditions for its administration, and to define its scope and its results. Part of that investigation will be to ascertain the possible advantage of combining the inhalation of a percentage of oxygen with that of the dioxide.

(c) *The "Respiratory Bottle" or "Bubbling Bottle" Method.* Meanwhile we have at hand a homely device which efficiently fulfils the main indication without involving any debatable theory. Its office is merely to encourage the patient to exercise the chest and to increase the depth of breathing. Any stable bottle will answer. It should be only partly filled (up to $2\frac{1}{2}$ to 3 inches) to obviate splashing or undue pressure. No cork is required; the end of an india-rubber tube four feet in length is introduced into the bottle and its loop secured to the neck of the bottle by tape or light india-rubber band, its other end being provided with a mouth-piece cut out of a quill or tooth-pick. The caliber of the mouth-piece, which should be between $\frac{1}{8}$ and $\frac{3}{16}$ of an inch in diameter,

regulates the rate of delivery of air. A good length of tubing is essential for convenient use in bed or on the sofa in the reclining position. The patient is directed to quietly blow a few bubbles without any strain, removing the mouth-piece from the lips for two or three ordinary breaths, to avoid any anxiety of breathing, before starting again. The short sittings of two or three minutes may be gradually increased in frequency, and will rapidly improve the breathing capacity without any effort.

For many years I have used this method as a rational adjunct to feeding and to passive movement in all forms of convalescence during their "bed stage." It reduces to a minimum the exertion which is inseparable from all forms of active respiratory exercise. If the window can be safely opened, it gives the resting patient the respiratory value of a walk in the open. It is therefore well suited as a substitute for active exercise in advanced arteriosclerosis with general enfeeblement.

Another advantage, specially valuable for "bad breathers" with a tendency to emphysema, may be obtained from its use on the sofa immediately before starting for a short walk around the room or out of doors, as it rests the patient, increases the range of respiration, and supplies him with an initial provision of oxygen for his exertion. Inasmuch as it corrects the faulty deficiency in the depth of expiration, it is our best means of rapidly reëducating the lost capacity for active exercise. It is superior in that respect to the inhalation of oxygen, which discourages the mechanical activity of breathing; and it closely approaches the value of the carbon dioxide inhalation which stimulates the respiratory act as a whole, but in the first place its expiratory phase.

AIDS IN DYSPNEA

In respiratory dyspnea the elementary essential is to learn how to breathe. It might be thought that the art should be instinctive; and that, seeing that in the normal state of restful breathing or of light exertion the respiratory act is adequate and yet unconscious, a similar automatism would obtain in other conditions, and that under stress of heavy work or of impeded respiration the subject would naturally utilize the most efficient means of meeting the difficulty. This may perhaps be the case in animals; if so, it is demonstrably not equally true in man, although Harry Campbell contends that it is. His well-known view is that in all respiratory difficulty the chest automatically increases in size, and that the attitude of inspiratory expansion which is assumed is the natural remedy, and should not be interfered with. Our own experience, whether in athletics or in disease, does not bear out that theory. In both cases we have to reckon with a disturbing factor, that of "respiratory anxiety," which encroaches upon the sphere of

respiratory automatism and ruins its perfect efficiency. This complication is an inevitable feature of the higher developments of the nervous system, which places our respiratory mechanism largely under the control of volition for the purposes of work, of phonation, of speech, etc., and under the influence of the higher psychical functions for the sake of expression.

THE REGULATION OF THE RESPIRATION OF WORK. Without attempting to deal with all the aspects of this large subject, but only with that of the influence of work it may be stated that the human prerogative of "the hand and its varied uses" is largely answerable for the impairment of the purely automatic scheme of our respiration. The chest muscles have to serve manual work as well as breathing, and that double service has many vicissitudes.

Volitional work involves more of mentality in proportion to its difficulty. The first stage of its study is a "systematic cramp" not only of the muscles concerned in its actual performance but of many others. Its artistic perfection is complete freedom from the systematic cramp, and a limitation of the volitional effort to the innervation of the quasi automatic work of the individual muscles required. This is the purpose and the method of all "training;" its first step is to break through the systematic cramp which at first seizes upon the respiratory function of the chest muscles by overflow from the systematic cramp due to their struggle with the complicated work. Perhaps the most telling proof that we may need teaching how to breathe is afforded by the training of the oarsman. The first essential for ultimate efficiency is to learn how to regulate the breathing. The same applies in a special degree to swimming.

Regulation of the Respiration in the Dyspnea of Disease is a *fortiori* indispensable. In this case the interference of the "anxiety of breathing" is not simply collateral by overflow, it is direct; it is not merely spasmodic, but abiding and progressive. And if any extrinsic work should be superadded, the spasmodic effect will be much *worse* than in the normal state. This clinical aspect of the question will be further discussed under asthma.

THE PULMONARY SUCTION MASK finds favor with Alfred Martinet in the *Presse Médicale* (January 3, 1912) as a means for the methodical regulation of dyspnea in therapeutics, while it is worn and it may be worn for hours, it allows of free expiration, while slightly impeding inspiration. The collateral advantages of its systematic use are the production of considerable pulmonary hyperemia, a lowering of arterial tension, a limitation of the excursion of the diaphragm, and a prevention of hemoptysis. It also enlarges the thoracic capacity and raises the blood count.

THE WALKING EXERCISE IN BED has for many years formed part of my clinical technique of convalescence. It consists in the systematic

performance in the supine posture of those movements of flexion and of extension of the lower limb which constitute the mechanism of stepping, with this difference that the excursions are amplified. In its position of full extension at the knee the limb is also given its fullest range of flexion at the hip, by raising the foot vertically into the air, and slowly lowering it while maintaining the complete knee extension. The maneuver, which is to be slowly practised alternately by the right and the left limb, begins by dragging the heel on the surface of the bed up to the buttock, and then raising the foot until full extension of the knee is obtained in the vertical position described. When this is specially indicated, the labor can be increased by wearing a weighted slipper. Another device is that of the rope and pulley with weight attached; the attachment to the limb is made by means of a padded anklet or stirrup. This weight method is better suited for the horizontal up and down movement of the foot along the surface of the bed than for the vertical movement.

HILL CLIMBING IN BED. Under this heading T. Büdingen has recently described a further mechanical elaboration of the "Walking Exercise in Bed;" and E. Veiel and T. Zahn¹ have used his apparatus for a study of the influence of passive exercise upon the circulation. Büdingen's² method was suggested by his objection to the Oertel system as applied to actual heart disease, and to the obese with weakened heart muscle. It is entirely passive and mechanical, and carried out on the lower limbs in recumbency. The apparatus is cumbersome; it alternately flexes and extends the legs, the calf being fixed above the ankle in a bony hollow splint or trough.

Hill Climbing may be facilitated, as A. Marquat³ points out, by a voluntary control of the breathing. This consists in keeping the respiration under the rate of eighteen, twenty, or twenty-four to the minute, and by maintaining the normal proportion of the expiration period as twice the length of the inspiration period. By regulating the respiration in this fashion the young can be taught to breathe properly, and the elderly with weakened hearts can often climb hills or stairs without getting out of breath and without puffing and panting.

AN INGENIOUS DEVICE FOR EASING STAIR WORK, particularly for cardiopaths, has been invented by E. F. Schurig⁴ in the shape of a slipper, the sole of which raises the foot by 8 cm., when in use; while it can be folded until it is not over 2 cm. thick and conveniently carried in the pocket. The right foot, in the slipper, steps close to the first stair; the left foot then steps on the first stair. The right foot, in its

¹ Münch. med. Woch., August 15, 1911.

² Cf. Deutsche Arch. f. klin. Med., 1911, vol. cii, p. 55.

³ Bulletin of the Academy of Medicine, December 19, 1911.

⁴ Münch. med. Woch., December 26; cf. Journal of the American Medical Association, 1912, p. 383.

slipper, is then placed on the same stair, and the left foot in turn placed on the second stair. The slipper thus interposes a midway step, doubling the number of treads (which are usually 16 cm. high). The body has only to be lifted 8 cm. at each step, which greatly reduces the exertion.

AN ADJUSTABLE FOOT BRACE FOR PATIENTS SITTING UP IN BED was presented by A. Ernest Gallant,¹ at the meeting of March 20, 1911, of the Medical Association of the Greater City of New York. The comfortable maintenance of patients in the semireclining, Fowler, or sitting posture while in bed is attended with considerable difficulty, and has taxed many ingenious minds for overcoming the common tendency to slide down to the foot of the bed. The foot brace consists of a wooden framework with a padded foot board adjustable by means of pegs, so that its distance from the foot of the bed can be regulated at will. Moreover, the muscular effort brought into play helps to maintain the tone and strength of the legs and thighs. By varying the extension of the foot rest from day to day, the pressure point on the buttocks can be changed, and bed sores avoided. A small pillow placed under the knees obviates wearisome strain on the hamstring muscles, and still further lessens the discomforts of sitting up in bed.

THE "ST. GEORGE'S HEART BED REST" (*Lancet and Brit. Med. Jour.*, vol. i, 1912) is the invention and the free gift to the Hospital of Sister A. E. M. Rowson, who has patented it in the exclusive interests of the Hospital funds. It is obtainable from Messrs. J. & A. Carter, of New Cavendish Street, London, W., who admirably carried out its construction. Clinically, it has proved to be unequalled as a help and comfort for orthopnea of all kinds, and for all conditions demanding an upright position. It is therefore likely to be in growing request in abdominal surgery, where the early postoperative treatment tends more and more to be conducted in that posture. The illustration (Fig. 22) gives its general structure at a glance; but its benefits can only be fully gauged by the patient, and by the physician and the nurse who witness his relief.

(1) All heart chairs or bed-rests support the patient by confining him; this appliance gives him complete freedom from any check or pressure and a much greater choice of altitude—namely, through a range of 180 degrees forward—than even his pile of pillows can afford to him from behind. (2) Their usually horizontal ledge tends to bend him forward at a considerable angle, whereas the wide horseshoe rest is everywhere on the slant, imitating the slope of the pillows behind him. (3) If the bed should be slanted for drainage there is no need to guard against his sliding. Even when moved down to the end of the slope to let the feet overhang, he is safely anchored by the comfortable grip of his elbows over the edge of the horseshoe. As a fact, with

¹ Cf. *New York Medical Journal*, vol. i, p. 1104.

suitable pillows the elbows are so natural a rest for his head, particularly in sleep, that the freely adjustable head support is most often discarded. In short, judged by his appreciation and by clinical observation this bed-rest does not seem to call for much correction or improvement. Specially intended for the constant use it gets in the wards, it has been devised on the "one solid piece" principle for utmost stability and duration. But while this makes it probably the lightest as well as the firmest and most movable of any similar apparatus, it would perhaps lose none of its main advantages by being constructed in detachable sections, when it could be most easily packed and carried for use in private practice. The two powerful supporting hoops, one of which bridges completely over the bed, are made of the lightest bent wood. The total weight is below 29 pounds, and only 27 pounds when the removable head-piece is lifted off.



FIG. 22

Another unique and inestimable boon for dyspnea is that, in the dorsal decubitus, when the patient falls back upon his pillows, the horseshoe can be moved close up to him to receive his arms, thus combining with a complete relaxation and support of the spine from behind some of that respiratory relief and fulcrum which is afforded by the stretched arm position, and which otherwise can only be obtained in the position of forward inclination of the trunk.

The Circulatory Importance of Tone and Atony is forcibly argued by A. Rose¹ on the evidence of a case of severe cardiac disablement, which in current phraseology might have been described as "heart-block," in an elderly subject of abdominal plethoric type, and which well

¹ New York Medical Journal, May 6, 1911.

illustrates his theme. His fundamental propositions are unassailable; the heart is a pressure pump and a suction pump. Each muscle is also a pressure and a suction pump. Relaxed tissues absorb fluid most readily, and detain it in proportion to their atony—if gravitation should favor its retention. In abdominal relaxation, such as his patient presented, *belting* will go a long way toward restoring an efficient circulation. Rose's own appliance is well known, but there are other good patterns, such as H. Weinstein's¹ abdominal binder for visceroptosis.

Phlebostasis and the Phlebo-stat. This is a practical application of the bloodless method of securing temporarily some of the circulatory advantages of blood-letting. S. Lillienstein's² "phlebo-stat" is simply a combination for simultaneous use of four pressure-cuffs for the four limbs. The indications are the same as for venesection; the contra-indications, a tendency to thrombosis, or edema, or varicosities. The procedure differentiates merely nervous from organic cardiac symptoms, the latter being exclusively benefited. Striking results are reported in nine typical cases of arteriosclerosis with myocarditis or mitral insufficiency, or with dilatation of the aorta and hypertrophy of the heart. The heart murmurs become modified, dyspnea and oppression, headache and vertigo are relieved; and some of the benefit is permanent.

THE MEDIASTINAL ORGANS

The Treatment of Exophthalmic Goitre. Theodore Kocher³ adopts the basis that in all forms of the disease the thyroid has undergone an anatomical change which results in increased function, whether in the primary form ushered in by nervous symptoms or in the long-standing cases converted later into the exophthalmic form, or in the toxic or infectious strumitis which ends in hyperplasia of the gland. There should be, therefore, no essential difference in the treatment of the neurotic and of the so-called secondary forms. The elimination of the symptoms is dependent upon the elimination of the disease from the thyroid gland. The leading experts in internal medicine and neurology have been induced, by the excellent results which have been obtained by timely and well-carried-out operations, to turn over their cases without reserve for the earliest possible operation after diagnosis has been made.

The Vaccine Treatment of Simple Endemic Goitre. McCarrison,⁴ observing that intestinal amebiasis was prominent in the endemic

¹ New York Medical Journal, May 13, 1911.

² Med. Klin., February 25, 1911.

³ Arch. f. klin. Chir., Band xcvi, Heft 2.

⁴ Lancet, February 10, 1912.

struma at Gilgit, has treated most successfully a series of "parenchymatous" cases with a vaccine prepared from the feces; cystic and fibrous degeneration being obviously unamenable.

The Diagnosis of Thymus Hypertrophy from enlarged glands is studied by d'Oelsnitz¹ by percussion and x-rays; but by T. R. Boggs² chiefly by percussion. *Bogg's sign* is an upward shifting of the lower level of the dulness when the "seated" subject's head (whether child or adult) is fully extended backward toward the spine.

Thymectomy and Thyroidectomy. Vol. xcii of the *Archiv für klin. Chir.* contains in its No. 4 some interesting conclusions. Those of H. Klose, on the *thymus*, condense his joint paper (with H. Vogt) in the *Tübingen Beiträge*. It should *never* be removed in young children, as this produces in animals, acid intoxication ("nucleinic") and lime poverty; though partial removal may be survived, thanks to vicarious splenic action. Thymus feeding does not help the thymectomized, as it increases the acid intoxication; the proper indication is to alkalinize the blood. O. Nordmann's thymectomies in puppies (*ibid.*) led to enormous atrophic dilatation of the heart, suggesting that the thymus antagonizes the suprarenals.

Kocher urges *thyroidectomy* in all exophthalmic cases not yielding quickly to small doses of iodide. Excess of iodine is responsible for many unsuspected cases of "iodin-Basedow." An enlarged goitre of seven years' standing was treated with iodine inunctions, with the result that 16 pounds in weight were lost in four weeks, and Graves' symptoms developed, which disappeared after partial thyroidectomy. The iodine percentage found in that gland was so high that it would, if equalled by that of the other tissues in the body, have corresponded to a total of 18.4 grams.

Mors Thymica and Asthma Thymicum. D. Ssokolow sets himself, in the *Archiv für Kinderheilkunde*, the difficult task of estimating from records in literature the mode of causation of 101 instances of death from an enlarged thymus, and of eliminating other possible causes; and a similar task in three groups of cases of thymic asthma with operative interference, tracheotomy, or intubation, where not only all other obstructive conditions have to be eliminated, but the distinction has to be made between "asthma" and "dyspnea." For that differentiation he points out as a clinical feature that in pure thymic asthma the dyspnea is mainly expiratory. The diagnosis of thymic enlargement, whether by percussion or the x-rays, is in itself a matter of some uncertainty; and, again, thymic asthma is not always to be easily diagnosed from capillary bronchitis. The paper which also gives an account of his experimental work on the thymus, works to the conclusion that the occurrence of sudden death is to be attributed not to mechan-

¹ Bull. Soc. Péd., June, 1911.

² Archives of Internal Medicine, November 15, 1911.

ical pressure but to a paralysis of the heart or respiratory centre by an excessive outpouring of the internal secretion of the thymus. As evidence of the essential importance of the latter for puerile growth, he refers to the detrimental results apt to follow operative interference, such as rachitis, as in König's case, or in experimental removal of the thymus in animals, and such as atrophy preceded by enteritis, as in the instance recorded by Rehn. He is, however, of the opinion that that office of the thymus may be partly fulfilled by other organs; and that in that sense its internal secretion is not absolutely indispensable. The question remains as to the mechanism of the damage inflicted by its excessive reabsorption.

Right-sided Displacement and Dilatation of the Esophagus in an Achondroplastic Dwarf Aged Thirty-three Years. This singular condition is reported by P. S. Hichens.¹ It was found that the esophagus was to the right of the spine, greatly dilated, and obscurely sacculated in its whole length. The muscular walls were greatly thickened and also the mucous membrane, which, however, was quite smooth and not congested. The walls of the esophagus were considerably thicker than the walls of the stomach.

To gain the stomach, the esophagus crossed the spine at a right angle. The mucous membrane of the esophagus showed no sign of ulceration, new growth, nor any stricture. The cardiac opening of the stomach admitted the middle finger of the hand. There was much debris of food in the esophagus, very little in the stomach. Fluid poured into the esophagus seemed to pass with difficulty into the stomach.

Aerophagia and Sialophagia. Pecus and Hayem² find in the horse the same varieties as in man. True paroxysmal "neurotic" aërophagia is clinically distinct from that sialophagic variety which is inseparable from chronic gastritis in all its forms, and usually from ulcer and cancer, in which air bubbles are swallowed with the saliva. Often this leads up to the neurotic air-gulping habit, which however may also be primary in its origin.

Hypodipsia and Oligoposia are differentiated by P. Fabre.³ They are, of course, distinct from *Adipsia* "absolute loss of thirst," and *Aposia* "complete cessation from drinking." The "oligoposia" which he describes in 23 cases, 15 of them females, suggests that a great proportion of our prandial libations is physiologically superfluous. For long periods these individuals took no fluid other than the water in their soups, sauces, meat, vegetables, and fruit.

¹ British Medical Journal, 1911, vol. i, p. 360.

² Bull. Ac. de Méd., February 20, 1912.

³ Ibid., February 27, 1912.

DERMATOLOGY AND SYPHILIS

By WILLIAM S. GOTTHEIL, M.D.

DERMATOLOGY

Antileprol. Jeanselme,¹ reviewing the various drugs and physical methods of treatment that have been lately advocated for this disease, acknowledges that none of them are satisfactory; personally he has had his best results from chaulmoogra oil injected mixed with equal parts of a compound oil made by mixing 0.5 gram of guaiacol with 0.25 gram of camphor and 5 grams each of vaselin and oil of vaselin. An injection of 6 c.c. equals 140 drops of the oil, and can be made three times a week. External local measures may do good in some cases, but they are liable to mobilize the germs and thus do harm. Radium and the Röntgen rays have sometimes proved efficient in arresting the nerve pains and causing some retrocession of the tumors, but their effect is very inconstant and unsatisfactory. The same may be said of the high frequency spark. A discussion of these measures, as well as of nastin, eucalyptol, and other recently proposed remedies, will be found in the review of the *Proceedings of the Leprosy Congress* held at Bergen in 1909.² In general, it may be said that unfortunately there has been practically no advance in the therapeutics of this affection in recent years.

Under these circumstances even isolated reports of partial therapeutic successes in this intractable malady are of interest; and in this connection I desire to call attention to some recent observations made by Engel Bey.³ Leprolin, the purified extract that he employed, has given some results in the ordinary tubercular forms of the affection in the hands of De Beuermann and others; Engel Bey has used it in 3 cases of nerve leprosy with good effects. Not only was there in all 3 a partial return of sensibility in the anesthetic parts and a reappearance of spark reaction in markedly paretic and atrophic nerve and muscle systems, but function returned in localities where motion and even life appeared to have departed. The author emphasizes this statement, and appropriately adds an exclamation mark after it. It is, he admits, no panacea, and cases will undoubtedly be found that

¹ Presse Médicale, December 2, 1911.

² PROGRESSIVE MEDICINE, December, 1910, p. 111.

³ Archiv für. Dermatologie und Syphilis, October, November, 1911, p. 147.

are refractory to its influence; but he firmly believes that it will have a favorable influence in the great majority of cases. External treatment, in cases in which there are nodules or ulcerations, should never be omitted; and of all measures, the use of ichthyol has given him most satisfaction. Experience has shown him that, with proper technique, much larger doses of antileprol can be given than were at first administered. He does not hesitate to exhibit from 3 to 6 per day.

Sudden Blanching of the Hair. Stieda,¹ after a careful historical examination of the recorded cases of this occurrence, in conjunction with his histological investigations as to the mechanism of grayness, comes to the conclusion that this does not occur, and that the cases in which it is said to have happened are all mistakes or pure deceptions. The belief in the possibility of its occurrence is a wide one; anxiety, worry, fear, and other violent mental emotions are supposed to have occasioned it; and the universal supposition if voiced in Byron's celebrated lines "—Nor turned it white in a single night, as men's has done from sudden fright." Stieda finds that the story of Marie Antionette's hair having turned white on the night before her execution was doubted by Charcot, who states that though the Queen was certainly gray at the time of her execution, she was gray nine months before, when the King was put to death. In this case, it is suggested that, under the stress and exigencies of the last weeks of her life in jail, the customary hair dye was neglected or could not be procured, and the victim appeared on the tumbril in her natural tresses. Equal doubt is thrown on the case reported of King Henry the Fourth of France, whose hair is said to have turned white from the horrors of St. Bartholomew's night. And so it is with all the other cases recorded in medical literature and general history; not one of them will stand the test of a searching examination.

As a matter of fact, Stieda finds that there is no possible physiological or pathological basis for the supposition of any process by which the entire shaft of the hair can be suddenly blanched. He rejects entirely the Metchnikoff theory of the removal of hair pigment by phagocytes; there is absolutely no confirmation of it. Nor is there any better basis for the older supposition that the disappearance of the pigment is due to its displacement by bubbles of gas or air. Physiologically, dark hairs when they fall out are replaced by gray or white ones in advancing life; exceptionally only is there a change in color while the hair is growing, so that the most recent or lower portion of the shaft is depigmented while the older distal part remains colored.

The matter is of little interest save as a refutation of a widespread and erroneous idea. We all, I am sure, know of cases in which any occurrence that would lead to any permanent interruption in their daily life habits would lead to the appearance of white hair.

¹ Monatschrift für praktische Dermatologie, April 15, 1911.

Blue Atrophy of the Skin from Cocaine Injections. Early this year I¹ reported a case of atrophy, with pigmentation of the skin, due to the habitual hypodermic employment of cocaine; a lesion that must be of rather rare occurrence, since I could find but one instance of it in the literature, and one similar result from morphine injections. Transient blue stains are not uncommon, of course; but permanent atrophies at the injection sites, with deep blue and lasting pigmentation, are very exceptional. The prevalence of these drug habits in our large cities, and the large number of patients from the classes in which they are most common that pass through the observation of our public institutions every year would indicate that some unusual conditions must be present to occasion its appearance in isolated cases. The orderlies and nurses in the City Hospital here, who have unusual opportunities for the observation of cases of the kind, inform me that blue stains from the injection habit are not infrequent, but that they are evanescent, and do not lead to any permanent change in the skin. I have seen them myself after the injection of the insoluble mercurials.

Thibierge² reports the case of a woman, aged forty years, who had been addicted to morphine since the age of sixteen. Her thighs were covered with pale blue spots looking like India ink tattooings, with slight cicatricial depressions of the markings. Histological examination showed the presence of black grains in the cutis, insoluble in alcohol, potash, and concentrated acids. There was no iron reaction. The granules were decided to be particles of carbon introduced with the injections, though their source was not ascertained. Horaud³ found on the corpse of a morphino-cocainist blue depressed spots, mostly on the arms and legs. The daughter of this woman, who had similar habits, showed less marked spots of a like character. She asserted that the cocaine injections only caused them, not the morphine. Horaud found that the lesions contain reduced iron clumped in the corium; he believed that this was due partly to the needles, and partly to adulterated injection salts.

My case was that of a female, aged thirty-one years, who was admitted to Ward 13, City Hospital, suffering from abscesses of the thighs. She had been a drug habituate for seven years, using morphine and cocaine hypodermically, separately or combined, and in indeterminable amounts. She was in poor general health. She had never had any trouble from her injections until three weeks prior to her admission to the hospital, since which time a number of the needle punctures had become infected. On the thighs and buttocks were a number of infections of the ordinary type, and there were a few on the arms. They were in all stages of evolution, from beginning lesions due to punctures

¹ Journal of Cutaneous Diseases, January, 1912.

² Annales de Dermatologie et de Syphiligraphie, July-August, 1901.

³ Lyon médicale, No. 23, 1907.

made in the last day or two, to healed abscesses that had opened, and the recent scars of infections that had run their course. There were no old abscess sites or scars from infections suffered long ago; bearing out the patient's statement that it was only in the last few weeks that these unpleasant injection effects had occurred. On the other hand, the thighs, buttocks, and arms were studded with innumerable atrophic and pigmented lesions, each one of which, according to the patient's statement, had resulted from a certain injection that she took. She considered them quite unimportant, since they did not bother her at all; and she was quite certain that they were not the marks of past

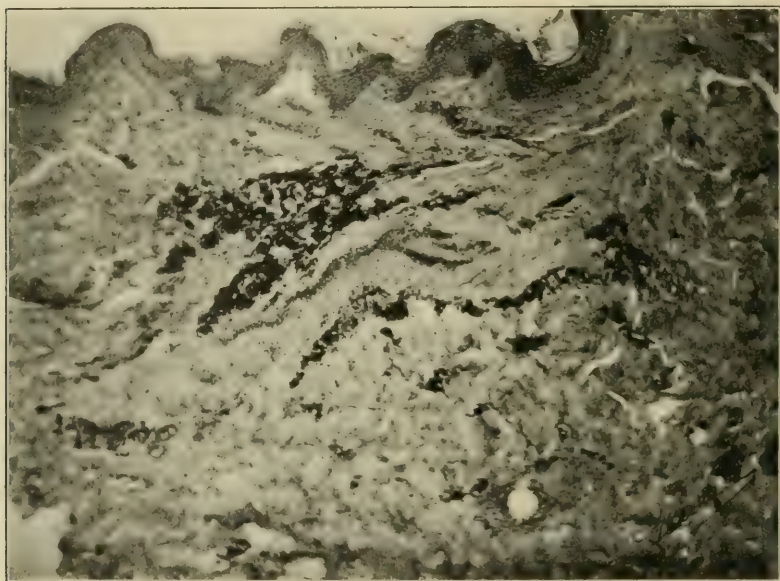


FIG. 23.—Blue atrophy of the skin from cocaine injections. Photomicrograph by the author.

infections like those for which she entered the hospital, but were the usual and inevitable results of her habit. These lesions were very distinctly marked pigmented atrophies of the skin, sharply localized, and more or less rounded in shape. Most of them were large pea-sized; some were smaller, and a few were as large as a bean. Each one was a sharply cut depression in the skin, the integument of the affected area being palpably thinned. They were all colored blue, in shades varying from a light cerulean hue to a deep blue black. They formed a peculiar picture on her very white and anemic skin, which looked at a distance as if it had been irregularly tattooed, or injured by the implantation of enormous gunpowder grains. Unfortunately, an accident occurred to the negative which I took of her skin, so that I am unable to picture it.

The patient's history was of interest. She had lived for a long time in a house with seven or more drug habitues, who all took sometimes morphine or cocaine alone, sometimes both together, and always by the syringe. The drugs were purchased for all of them together, in solution, which was always clear as water; and the ordinary steel needles were always used. Several of the other inmates of the house, the patient stated, had similar stains from the injections; but she was not sure that all of them had them. She was quite positive that no marks resulted from the use of morphine alone; the puncture sites disappeared entirely in a short time. But when cocaine was used with the morphine, or when the former was used alone, a mark always remained.

The patient's infected lesions were treated *secundem artem* by incision and drainage, and healed rapidly. It being found necessary to continue the use of narcotics on account of the patient's condition during the short time that she consented to remain in the hospital, a number of experiments were made with the two drugs, both alone and in combination. In no case did any inflammatory reaction atrophy, or pigmentation result. The microscopic examination of a biopsified lesion showed the presence of a very black pigment scattered and clumped in the various layers of the cutis, and mostly in its central portions. It occurred in the form of more or less rounded or irregular granules, aggregated in places into larger irregular masses. It lay among the collagen bundles chiefly in streaks parallel to the surface of the integument, and some of it quite plainly occupied the lymphatic spaces. In many places the pigment masses were surrounded by a moderately extensive small-celled inflammatory exudate. There were a few isolated pigment clumps in the subcutis, and occasional masses of the same around the coil glands. The corneous layer and the rete were unchanged. The collagen bundles were not apparently affected, save that there were fewer of them where the pigment was most abundant; so that the entire cutis was thinner there than elsewhere. The deposit was entirely extracellular. On account of its small quantity, the nature of the pigment could not be determined by the ferricyanide test (Fig. 23).

Permanent blue pigmentation without atrophy has been seen by a number of observers, and from various drugs injected. As above stated, I have seen it from mercury. Gaillard showed a patient, at the Medical Society of the Paris Hospitals some years ago, with multitudes of these lesions from morphine. A similar case had been previously presented by Moutard-Moulin. Blood pigment as a cause of the permanent discoloration can be excluded, since it would soon be absorbed. It has been supposed that particles of steel from the needles might have become detached and entered the punctures, leading to the deposition of metallic iron in the tissues. Were that the case, however, the

pigmentations would be very common, and would certainly be well known in the City Hospital, where many scores, perhaps hundreds, of "needle users" are examined every year. Another explanation that has been offered is that the pigment consists of particles of carbon introduced after flaming the needle for sterilization; but practically none of the habitués ever employ this precaution, and certainly the patient here recorded did not; and physicians use it habitually to a large extent, and do not see the pigmentations. The atrophy that distinguished the three cases here mentioned is probably inflammatory in origin; both it and the pigmentation point to the presence of some irritant or foreign body that, under certain circumstances, is introduced into the skin with the injection. I am unable to offer any satisfactory explanation of its occurrence.

Some trials made by my assistant, Dr. Satenstein, may throw light on the pigmentation herein recorded, though it leaves the atrophic changes unexplained. Morphine solution allowed to remain in the lumen of the ordinary hypodermic needle over night, either dried up or came out as a clear drop in the morning. Cocaine solutions, on the other hand, if any remained in the metallic channel next day, showed a distinct bluish tint. Possibly this may be due to the action of the hypochlorate of cocaine on the metal on prolonged contact. It does not help us, however, to understand the atrophy, or the coloration that sometimes follows morphine and mercurial injections.

Points in the Early Diagnosis of Cancer of the Skin. In last year's review I detailed some of the modern methods of treating skin cancer,¹ and in an article published since that was written² I have dwelt again on the vital importance of early diagnosis. It means, in the great majority of cases, prompt, radical and permanent cure. In cancer of the internal organs, on the other hand, the earliest possible diagnosis may be unavoidably uncertain, may call for serious operative procedures that cannot be lightly undertaken, and may, even with their aid, lead merely to mitigation of suffering and prolongation of life. With the advantage of having the affected organ spread out before us, accessible in every part to sight and touch as well as to microscopic investigation, the diagnosis of malignancy can and should be made in the skin at a stage so early that similar changes in an internal organ would give rise to no symptoms at all.

Even this, however, is not the whole story. Knowing, as we well do, the conditions under which skin cancers are prone to develop, we should be prepared for them, and take our remedial or, rather, preventive measures before the cancer has indubitably appeared. Thus in view of the recognized tendency of the senile skin to develop degenerative processes, any deviation from the normal course of senescence in the

¹ PROGRESSIVE MEDICINE, September, 1911, p. 104 et seq.

² American Journal of Surgery, August, 1911.

skin should awaken our suspicions, and set our therapeutics going. By senescence of the skin I do not mean necessarily the integument of an old individual; I mean a skin that is itself old, that is atrophic, wrinkled, and pigmented, though its owner may be comparatively youthful. Sebaceous or senile warts, pigmentations, insignificant flat papules covered with brownish, greasy scales, and similar abnormal structures are common in such skins; they are usually benign, and may remain so for years. But let one of them begin to make its presence felt by itching, burning, or other irritation, so that the bearer commences to remove the constantly reaccumulating mass with his finger nails, and the foundation for a malignant neoplasm is laid, or it has already its insignificant beginning. Hence, the rule to remove these senile excrescences radically whenever it is practicable; and certainly to do so with every one that shows any signs of irritation or any departure from its ordinarily indolent and quiescent condition.

Certain other benign tumors, congenital and acquired, are notoriously prone to undergo malignant degeneration with advancing years. Such are the pigmented nevi, more especially those that are highly chromatinized. On the body they usually remain innocent until the end; but on the exposed parts, on the face and hands, their course is often a different one, and it is good practice to remove them whenever feasible, before they have any chance to develop their malignant possibilities. The obstinate fissures of the lips and nostrils that occur in certain individuals are legitimate objects of solicitude when the persons affected with them have reached or passed middle age. They sometimes become the seat of malignant degeneration, and they should be treated and cured before they have had an opportunity to do so. Mention may also be made here of the condition of the skin consequent on frequent or too long-continued exposure to the *x*-ray. A single or a few excessive doses of the ray may cause an intractable dermatitis of a peculiar kind, often with an ulceration that lasts for many years and may terminate in the development of true cancer. On the other hand, repeated exposure of the skin to small doses of the rays over a long period of time leads to the slow supervention of changes which are exactly similar to those occurring in senility of the skin, or in that rare congenital senility of the skin, if the term is allowable, that we know as xeroderma pigmentosum. The skin is wrinkled, dry, and thinned; telangiectases, pigmentations, sebaceous scales, and larger warty growths abound; and epitheliomatous degeneration, usually in multiple foci, appears sooner or later. These occurrences are luckily not so common now as they were in the early days of radiotherapeutics, when we were less alive to its dangers and multitudes of men were exploiting it. I am gradually coming to the opinion, however, that in any radiodermatitis, the period of ordinary or really tentative treatment should not be very prolonged. Any condition of this kind that does not show signs of

yielding in a few months should be the object of radical surgical treatment. An extensive plastic operation, if the skin only is involved, or amputation if the deeper tissues are affected, is preferable to the interminable and almost hopeless task of attempting to procure repair in tissues that will almost inevitably become cancerous before the sought-for end is attained.

Too frequently indeed we are not given the chance of removing these precancerous lesions of whose danger we are well aware. Luckily skin cancers are always slow of growth, and almost always of perfectly characteristic appearance. A moment's consideration of the disease process will show why this must be so. Cancer of the skin microscopically consists essentially in an abnormal proliferation of the deeper layers of the epithelial elements of that tissue; and these are covered externally only with the tenuous superficial flattened cells of the outer layer of the skin, the corneous strata. In the beginning, the external resistance to the growing mass is always very much less than that of the deeper tissues; so that there is always a tumor, though it may be extremely small and inconspicuous. This consists of the mass of newly grown epithelial cells. Just as the layers of epithelial cells in the normal skin give rise to all the white in its color, all the other elements, muscle tissue, vessels, and blood being various shades of red, this larger epithelial cell mass causes a whitish, mother-of-pearl appearance when it is present which is distinctly differentiable from the color of the normal epithelium. It is also harder, being larger in amount and more closely packed. As the mass increases in size, the pressure on the outer layers of the epidermis increases; it proliferates in the depths of the tissues, and elevates the deeper seated and vessel-containing papillary layers. When, therefore, the epithelial accumulation has attained a certain size, minute arborescent vessels can be seen on close inspection with the naked eye, or more distinctly with the help of a magnifying glass, coursing over the top and sides of the cell mass. And on the peculiar hard, white, epithelial cell accumulation with minute blood-vessels running over its edges and top, the diagnosis of cancer of the skin in its earliest stages can always be made.

Later on, when the new and non-vascular cell mass has attained so large a size that cell nutrition in the centre fails, breaking down occurs. And here it is that that irritation and superficial destruction of the still normal surface epithelial cells, whether by the physician by ineffectual cauterization (as with silver nitrate) or superficial curetting, or the patient with his home remedies or finger nails, play their disastrous part. The epithelial accumulation, *per se*, does no harm, apart from its inconvenience or undesirable cosmetic effect. Once, however, the normal and resistant surface epithelium is removed, the ordinary pus organisms begin their work, and inflammation, ulceration, suppuration, pus absorption, lymphangitis, lymphatic gland infection, sepsis, and

all the long train of symptoms commonly associated with cancer, but really due to the superinfection, appear. A pregnant example of the kind has quite recently come under my notice. An Italian laborer, aged fifty-four years, came to my clinic at Lebanon Hospital complaining of a tumor of the tongue that had been slowly growing for six months. His teeth and mouth in general, was in fair condition; he had no pain and no trouble at all from the mass, and he only came because it discommoded him a little in speaking and eating. Yet the hard and circumscribed mass was fully an inch and a half long by three-quarters of an inch broad, and lay in the anterior half of the left side of his tongue like a large filbert. His general health was perfect, and his lymphatic glands were free; the epithelial surface of the organ was entirely normal, and of course, there was not a trace of odor. It was clinically undoubted cancer; a small biopsy was done for microscopic purposes, to exclude the only other possibility in the case (his blood serum was Wassermann negative), that of a gummatous infiltration. If it turned out to be the latter, no harm would be done by the small lesion, and treatment would quickly remedy the affection and save him his tongue. If it proved to be cancer he was to be sent immediately to the surgeon for operation. The latter proved to be the case. The point I desire to emphasize, however, was that three days after the biopsy he was in distinctly worse condition. He complained of pain, there was suppuration, the neighboring lymphatic glands were a little tender and swollen, and the characteristic fetor had appeared.

Even when ulceration has occurred in a cancer of the skin, however, and in spite of the complications and changes in appearance occasioned by the pus infection that is necessarily present, the advancing margins of the mass, being composed of the same elements as the original tumor, and being under identical conditions, will present the appearances noted above. No matter how large the ulceration may have become, the skin edges of the lesion will show, in places at all events, the hard, pearly masses of new epithelium and the arborescent new vessels. The picture may be apparently altered in many cases, but careful observation will reveal the characteristic points. Thus, in the very common fungating form of epithelioma, in which the cell mass grows up into a prominent, soft, raspberry-like mass, removal of this latter with the curette, or merely even lifting it aside with a probe, will reveal the hard, white, infiltrated margins and base of the true skin lesion.

Chancroid Vaccine. Three years ago I reviewed the present status of chancroidal therapeutics in these pages,¹ calling attention to the facts that chemical applications were being rapidly displaced by mechanical agencies, such as refrigeration by means of the ethyl chloride ray, or the solid carbon dioxide, or heat, by means of hot air,

¹ PROGRESSIVE MEDICINE, September, 1909, p. 108.

the Paquelin cautery, hot douches, etc. The *Bacillus chanceri mollis*, or Ducrey bacillus as it is more commonly known, is the most important, if not the only, etiological factor in the affection, and its life limits as regards temperature range is very limited. My conclusions still hold good; but the recent experiments of Herbst and Gatewood¹ are of considerable interest and open up a new field of investigation. Though they were unsuccessful in their endeavors to obtain pure cultures of the organism, they made complete bacteriological examinations and vaccines in 26 typical cases of chancroid. Thirty-eight cases were treated with these vaccines, which were administered by subcutaneous injection into the abdominal wall. Seven patients disappeared after the first or second injection, so that 31 cases in all are reported on. There was little or no reaction; the dosage ranged from 50,000,000 to 400,000,000, 1 to 2 cubic centimeters being the amount of fluid injected each time. At first the injections were administered once a week; later they were given twice a week; and in one case injections were made daily for ten consecutive days, with no bad effects at all and a decided improvement in the local condition. Of the entire series of 31 patients, an absolute cure was obtained in 12, the time required varying from five days to three weeks. In 7 other cases, there was decided improvement; but the authors hesitate to ascribe this to the injections, either because the time required was too long, or because healing was incomplete. The authors' conclusions are given with reservation in this preliminary report, and are as follows:

1. In most cases an organism, belonging to the pseudodiphtheria group, was found, in some instances almost in pure culture; a morphologically identical organism is commonly present in the urinary tract and on the genitalia; this is the Ducrey bacillus.

2. Chancroids being common in dispensary practice and rare in private, it is possible that the bacillus described by Ducrey is merely one of the pseudodiphtheria group that is common on the genitalia, rendered pathogenic by filth.

3. The percentage of cures with the vaccine was 39 per cent.; but in the earlier cases a weak and non-potent vaccine was employed. It is probable that a greater percentage of successes will be obtained when the method is elaborated.

These investigations are interesting and may ultimately lead to practical results; but at present, from the view point of the practitioner, that (1) until a heterologous vaccine is placed on the market it cannot be employed save by those enjoying special laboratory facilities; and (2) that the chancroid is essentially a local infection for which we possess readily applicable and easily obtained local remedies. Of greater practical use is the *resumé* of Gougerot,² which may be taken

¹ Journal of the American Medical Association, January 20, 1912.

² Paris Médical, April 20, 1912.

to represent the most advanced modern views as to the proper treatment of the affection and its complications. The adenitis or bubo, which invariably accompanies the affection, demands careful treatment. Absolute rest, with the local use of collargolum or blue ointment may suffice; but, if suppuration occurs, the tumor should not be incised at once; the mass should be punctured with a thick needle, not a trocar, and at its border rather than in the centre, all fluid material evacuated, and iodoform ether or mercury benzoate emulsion injected. The liquid injected should be reaspirated, and not allowed to remain. A compress dressing should then be applied, and a fresh injection made the next day at a little distance from the first. If incision does become necessary, the abscess cavity should be subsequently irrigated with a 1 per cent. silver nitrate solution. For the chancroid itself, Gougerot recommends hot air cauterization, or the thermo-cautery under anesthesia, or a chemical caustic.

Sporadic Elephantiasis. Chronic hypertrophy of the skin of a portion of the body, with more or less papillary outgrowth, is always due to persistent obstruction of the lymphatics of the part. From an etiological point of view, two distinct forms may be differentiated, though they are not clinically distinguishable from one another. In the endemic tropical form, which is common among the poor in China, Africa, Central America, etc., the lymphatic obstruction and subsequent chronic inflammation is due to plugging of the lymphatic vessels with the *Filaria sanguinis hominis*, which may be found in the blood at night. The sporadic form occurs all over the world, and is due to repeated attacks of dermatitis, erysipelas, cellulitis, the pressure from tumors or scars, or any pathological process or condition which leads to the permanent obstruction of the lymphatic channels. The etiology in many of the sporadic cases is, however, not ascertainable; and hence, the case recorded by Winthrop¹ is of interest, in which erysipelas and puerperal thrombophlebitis occasioned the disease.

The patient was a woman, aged forty-eight years, who at the age of fifteen years had had an attack of erysipelas of the left leg, which disappeared without leaving traces. At the age of twenty-eight years, after the birth of her second child, she had a "milk leg" on the right side, from which she never recovered completely. Recurrent attacks of erysipeloid inflammation over a long period of time led to the gradual development of great thickening and nodulation of the skin of the limb; and this in the course of years increased in size, extended up to the knee, and became more and more nodular. When seen by Winthrop, the skin of the entire limb was enormously thickened and nodulated, especially on its posterior surface. Strange to say, the sole and dorsum of the foot itself were not involved, the hypertrophy beginning at the ankle and just above the heel. The interstices of the hypertrophied

¹ Journal of the American Medical Association, November 11, 1911.

skin were filled with foul secretion, and there was eroded area at one or two places. No filaria were present at any time; the blood and urine were normal. There was undoubtedly a chronic obliterative endophlebitis, beginning with the puerperal phlebitis of many years before; the chronic lymphatic stasis and persistent lymphedema leading to gradual connective-tissue overgrowth and hypertrophy (Fig. 24).



FIG. 24.—Sporadic elephantiasis. Winthrop's case.

The Rational Treatment of Furunculosis. It is eight years since this subject was last considered in this review;¹ not on account of any lack of interest in this common and often distressingly obstinate skin affection, but rather because there has been no noteworthy change, either therapeutically or etiologically, with regard to it. Treatment cannot be very satisfactory, to judge by the constant stream of suggestions in this regard that flows through the medical journals; and it is perhaps timely to review some of the more recent of these, as well as to record the conclusions that experience has led me to personally.

¹ PROGRESSIVE MEDICINE, September, 1904, p. 120.

As regards the general treatment, I have little to add to the advice given in the previous review. Some connection between furunculosis and internal conditions seems probable, but our knowledge concerning it is very indefinite. In a general way, I have found tonic treatment useful; including under that title all such measures as rational exercise, abundant fresh air, baths, change of climate, etc., as well as medicinal agents. Some restriction of diet is advisable, especially of the albuminoid foods; as well as of special articles of diet, such as cheese, which the individual experience of patients may have shown them to predispose to attacks. Free evacuation of the bowels, and the use of intestinal antiseptics certainly has a good influence in many cases. But in the majority of cases there is no demonstrable connection between the local lesions and internal conditions, and the topical treatment remains as before, our chief reliance.

Treatment with the various serums, vaccines, emulsions, etc., has not been successful to a degree or with an amount of uniformity sufficient to place this method on a firm basis. Isolated favorable reports are confronted with many cases in which no effect has been attained; and the usual practice of combining an injection treatment with local measures of undoubted efficacy robs the conclusions attained of all their demonstrative value. While no conclusions can be reached at present as to the real efficacy of the treatment, I can only say that I have never seen any marked effects from it. Brocq¹ admits at the utmost a temporary improvement from these measures, and lays the chief stress, as do almost all dermatologists, on local therapeutics.

Fuchs² has treated furuncles for many years with the collodion ring, which is readily employed and has given him good results. This is applied several times a day all around the infected area, until the contraction of the successive layers causes a deep depression encircling the lesion; in three to five days the central necrotic plug comes out readily. Bruch³ rejects incision, covering the entire infected region and its neighborhood with pure ichthyol applied with a glass spatulum. The dressing is removed every day with benzine and renewed. He claims that the treatment relieves pain and prevents new infections. Keppler⁴ employs the Bier hyperemic treatment by preference, which view I cordially endorse.

Skilern⁵ has recently gone into the subject in detail, and as his views coincide almost entirely with my own, I reproduce them. Poultrices are objectionable since, while they may soothe the pain, they devitalize the borders of the furuncle, prolong the period of resolution, increase destruction and subsequent scarring, and, I may add as most

¹ Bulletin médicale, 1911, p. 441.

² Münchener medicinische Wochenschrift, 1911, No. 22.

³ Ibid., 1911, No. 25.

⁴ Ibid., 1911, No. 30.

⁵ Journal of the American Medical Association, September 16, 1911.

important of all, tend to spread the infection to new foci. Bichloride devitalizes the leukocytes and disintegrates the serum; it is intensely irritant, and predisposes neighboring parts to infection. The knife is only to be employed when complete excision is decided upon; partial opening after the old method is inadvisable. He treats furuncles as follows:

It being rational to afford some outlet for the products of liquefaction necrosis but not lose the beneficial serum and leukocytes, a slight painless scratch with a scalpel point over the central vesicle is all that is required. A drop of sero-pus follows, and the infected hair follicle and sebaceous gland are exposed. A cup covering the whole affected area is then applied, and by suction the necrotic products are removed. In addition, fresh blood and fresh serum with vigorous leukocytes are drawn into the lesion from nearby tissues; this is the most important effect of the cupping, since these new elements are going to cure the furuncle, and not the surgeon's knife. Even the knife scratch may be unnecessary, the cupping alone may suffice to open up the lesion. A wet dressing is then applied. I am in the habit of using plain boracic acid solution for this purpose; Skillern advises normal saline solution with sodium citrate, claiming that the latter drug in 1 per cent. solution precipitates the calcium salts in the lymph, ensures a free outlet to the discharge, and by osmosis promotes that abundant flow of fresh lymph to the infected area which is the main agent of its cure. The wet dressing can be made extemporaneously by adding a teaspoonful of sodium citrate and two and one-half teaspoonfuls of table salt to a glass of hot boiled water. This drain poultice, as the author calls it, almost always obviates the necessity of drainage by rubber tissue or gauze. The cupping and dressing should be repeated frequently, every four hours if possible, until the slough is loose; this latter may then be removed with the forceps. Healing is after that rapid and uninterrupted under any aseptic dressing, and the resultant scarring is very insignificant.

A very important point is the prevention of fresh infections; I have always insisted on the prophylactic treatment of the surrounding skin as well as that of the lesion itself. A large area around the furuncle, or the whole skin of the part affected, should be shaved and disinfected with alcohol or tincture of iodine. An occlusive dressing of some wet non-irritant antiseptic (boric acid or aluminium acetate solution) should then be applied. While the furuncle is under the active treatment outlined above, careful cleansing at each cupping will suffice; later on, infection of new foci can be prevented by strict antiseptic occlusion of the entire area of skin. I have repeatedly seen most obstinate cases of recurrent furunculosis of the neck get well when that area and the posterior part of the scalp are kept carefully shaved, cleansed, and permanently covered with an antiseptic dressing.

Gonorrheal Skin Eruptions. A brief account was given in these pages last year¹ of the hyperkeratoses occasioned by the action of the gonococcus of the skin; the entire subject of general infection by the gonococcus has recently been worked up by Arning and Meyer-Delius.² They call special attention to a peculiar form of balanitis which they designate balanitis erosiva circinata, which they add to the joint affection and the cutaneous hyperkeratosis as symptoms of the general infection. Their conclusions are that there is a definite kind of general infection due to the gonococcus, characterized by the occurrence of multiple, subacute arthritides not leading to ankylosis, with gonorrheal keratoses, and certain affections of the mucous membranes. The latter usually appear as an endogenous conjunctivitis, but may be seen as a circinate balanitis. It is well enough to bear these occurrences in mind as possible symptoms of the gonococcal infection; but they are undoubtedly extremely rare. Gonorrheal arthritis is frequent, but the keratosis cases are still individually recorded; as to gonorrheal conjunctivitis and balanitis, I do not recall ever having seen a case; and inquiry of my colleagues in the genito-urinary service at the City Hospital showed that they also had never encountered it.

Heerfordt³ considers the infection from the ophthalmological point of view, though emphasizing the epidermic hypertrophies and the hemorrhagic and vesicular eruptions that are sometimes seen. They wax and wane in intensity with the urethritis; exactly the opposite to the arthritis, which is prone to advance as the urethral discharge diminishes. Gonococci are rarely found in these dermal signs of infection; Heerfordt, therefore, believes that they are occasioned not by the living gonococci themselves, but rather by fragments of them or by their toxins.

Lymphangioma. This is a dermal abnormality rather than a disease; and while it is of rare occurrence it is worthy of note on account of its liability to be mistaken for other conditions. The accompanying illustration (Fig. 25) is from a model that I made of a case seen some little time ago. The patient was a girl, aged ten years, and had had the lesion since birth. On the right side of the thorax and abdomen, occupying a large area about midway between the lines of the nipple and the centre of the axilla, and below the level of the former, was a large aggregation of distinctly vesicular lesions. Multitudes of them were so minute as to be visible only on the closest inspection; but some were as large as small French peas, and in places they were aggregated into bigger and prominent compound groups. Most of the vesicles were filled with a clear fluid of a slightly yellowish tinge; some, however,

¹ PROGRESSIVE MEDICINE, September, 1911, p. 116.

² Archiv für Dermatologie und Syphilis, May, 1911, p. 3.

³ Graefe's Arch. f. Ophth., lxxvii, Band 1; Arch. f. Dermat. u. Syph., May, 1911, p. 361.

were bright red or bluish purple, showing that the bloodvessels of the area were involved, as well as the lymphatics. Pricking one of the clear vesicles caused the flow of a droplet of clear serum; and this serum continued to trickle out in a minute stream for a long period, gradually to cease spontaneously. A sanguinolent serum flowed under similar circumstances from the darker vesicles; in no case was there pure blood. I can explain this only on the supposition of the rupture of blood capillaries into the lymphangiomatous dilatations, since it is hardly likely that there would be any direct connection between the two systems of vessels. The mother of the child stated that injuries to the little vesicle tumors were not uncommon from scratching, and that the persistent oozing that then occurred was very troublesome. The condition, of course, could have been readily remedied by the destruction of the larger individual lesions with a fine cautery point or a sharpened stick of solid carbon dioxide; but the patient disappeared from observation without allowing anything of the kind to be done.

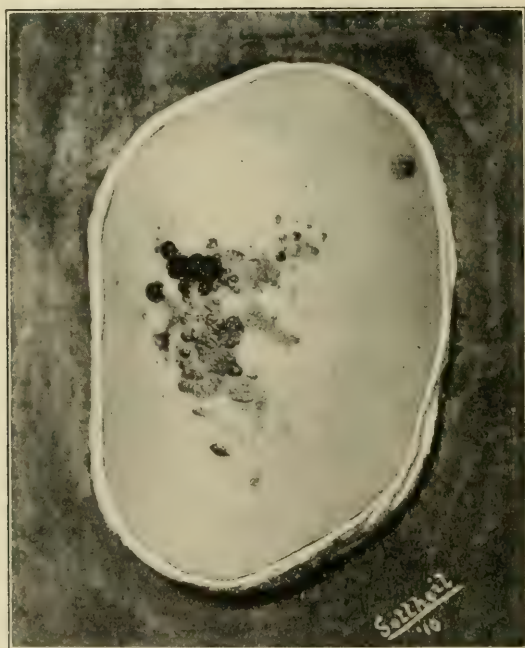


FIG. 25.—Lymphangioma, from a cast made by the author.

Ointments and Ointment Bases. Very little attention is paid by the practitioner to the bases of his external applications; yet the matter is of some practical importance, and I frequently have occasion to trace the non-effect or ill-effect of perfectly well-selected external medicinal applications to the use of an improper or inapplicable base. The drug compounder, if left to his own devices in the matter, will

select vaselin as the most easily used base; and in this he is supported by the authorized pharmacopœia, where that base is the usual one. Yet the various bases employed, lard, vaselin, suet, wool fat, spermaceti, etc., vary greatly in their immediate effect on the skin, on the medication of which they are the vehicles, and on the amount of penetration and absorption they permit.

Wild¹ has experimented on the relative protective and penetrative powers of the various ointment bases, and has also attempted to determine the amount in which certain drugs were absorbed when applied to the skin in various combinations. A definite amount of the ointment base or the salve was rubbed into a definite area of skin for a fixed time. The application was then carefully scraped off the surface with a dulled safety razor blade the weight of which was known, and the instrument and ointment removed was weighed. The loss of weight represented the amount of ointment absorbed, with the amount lost during manipulation. This latter factor was, of course, constant for preparations of similar consistency; so that a fairly reliable relative result could be obtained. Wild found that solid paraffin and paraffin ointment were hardly absorbed at all; they remained on the skin for an indefinite time. Lard and olive oil he found to be absorbed to the extent of 15 per cent. after two minutes' rubbing. Lanolin or hydrated wool fat, when it contains a proper amount of water, was absorbed to the extent of 20 per cent. when used for the same time; but older specimens which were dried out showed this property in much less degree. The maximum amount of absorption was obtained from a mixture of equal parts of glycerite of starch and hydrous wool fat.

Corlett² strikes at the root of the matter when he says that the ointment base must be selected in accordance with the result desired to be attained. From the clinician's point of view, ointments may be considered under the following general varieties: (1) Protective, emollient, or soothing; (2) astringent; (3) stimulating; (4) antiseptic, and (5) absorbent. For the first class the base should not be absorbable, but should remain as a pliable, more or less impermeable, covering to the skin. Petrolatum, usually employed, is distinctly irritant to some skins; Corlett approves of it if properly refined; I think, however, that we have better bases for the purpose. Lard, properly sterilized, and with the addition of benzoin or beta-naphtol to prevent decomposition, is excellent for this purpose, especially when combined with a certain proportion of non-absorbable substances, such as paraffin, wax, or spermaceti to stiffen it and hinder its penetration.

For astringent ointments, where superficial action only is required, lard again may be used; where, as in chronic inflammatory processes, a deeper effect is needed, lanolin or wool fat combined with water is

¹ British Medical Journal, July 22, 1911.

² Cleveland Medical Journal, March, 1911.

appropriate. For the stimulating ointments, vaselin is the best general base; the fact that it is occasionally irritant does not, as a rule, interfere with its action. For the last two classes, the antiseptic and absorbent ointments, deep penetration is required; and here lanolin, goose fat, and the various vegetable oils form the best bases.

Corlett rightly criticises the various preparations, mostly "made in Germany," a few in France, which as pastes, pencils, salve, and plaster mulls are enthusiastically advised as substitutes for the official ointments. Many of them are ineffective, and all of them are difficult to obtain and hence cannot be within the reach of the average practitioner. He is a little too sweeping, I think, however, in claiming that all of them are disappointing. I keep a supply of the more durable plaster and salve mulls on hand; and I find some of them, such as the chrysarobin, white precipitate, mercury, and carbolic, etc., mulls very useful for the treatment of localized and obstinate affections of the skin. Their main advantage is convenience of application and adjustment; a plaster application being much easier to put and keep on than an ointment. For general use, however, an extemporaneous ointment with base and medicinal ingredient properly selected, is far the best; in some cases the official ointments will do. Utterly to be eschewed, however, are the proprietary ointments with the samples of which we are pestered. Plain lard, with a little zinc, tar, or salicylic acid in it, will give us better results.

Pruritus Ani. The perennial discussion of this subject is good evidence of the deficiency of our knowledge as to its cause and the inefficacy of our attempts for its relief. It is well understood, of course, that the pruritus itself is in almost all cases merely a symptom, and that treatment should be directed to the underlying cause when that is ascertainable. In the great majority of cases there is a distinct eczema of the anal region, as shown by the redness and thickening of the skin and mucosa, the fissures and excoriations, etc.; though it is always difficult to decide in how far the eczema is the primary affection or how far it is secondary to the scratching, irritation, and want of scrupulous cleanliness that always accompany the affection. A new line of investigation of these matters has been opened by Murray,¹ who, during the last two years, has made careful bacteriological examinations of 19 typical cases, in all of which he found streptococci present upon the skin in excessive numbers. In 5 control cases suffering from other rectal affections, only 1 showed streptococci on the skin and very few of them at that. In all the 19 cases, an opsonin test showed that the resistance for streptococci was low, while it was high for other organisms. Murray's patients, in general, were strong, well-nourished, and healthy individuals; yet they all showed low amounts of opsonins for streptococci. He believes that faulty metabolism must be the cause; a majority of the

¹ Journal of the American Medical Association, December 9, 1911.

cases had indicanuria, though, of course, all cases of indicanuria do not have pruritus. It is interesting in this connection to recall the fact that years ago a great deal of work on the etiology of eczema led a number of competent observers to conclude that a microörganism of some kind was the essential factor. The subject was treated of at length in the reviews of past years, to which the reader is referred,¹ but it is noteworthy that at the present day, though we are still ignorant of the cause of most cases of eczema, and regard it rather as a symptom complex resulting from many causes, the belief in the role of parasites as etiological factors of the affection is losing, rather than gaining, ground. Murray's conclusions are only preliminary, as he admits, and I consider his position weak, more especially since he treats pruritus ani as a disease rather than a symptom, and in many cases as a symptom of a pronounced eczema. Regarding his conclusions as to the efficacy of the vaccine therapy, the reader is referred to the article on that subject in the present review.

1. Pruritus ani is caused by an infection by or associated with one of the organisms of the streptococcus group. It may be the primary, secondary or aggravating cause, and in the latter 2 cases the original cause may already have passed away.

2. Technically, to the bacteriologist the streptococcus may not seem to be the real cause of the disease; to the patient, and to the physician who treats him, streptococcic infection best answers the question of etiology.

3. Whether the infection occurs because the opsonins for streptococci are low, or whether the opsonins are lessened because of the invading organisms is not yet known.

4. If the opsonin test is low for *Bacillus coli* or any other bacterium, there may be a complicating infection.

5. A vaccine made from a culture of the offending germ offers our best hope of cure.

6. Whether any local treatment for temporary relief while awaiting the results of the vaccine treatment is advisable or not must be left to the judgment of the attending surgeon. Some of the cases detailed were treated with autogenous vaccines alone, and the results were as satisfactory as in those cases receiving topical treatment also.

7. The whole matter is still *sub judice*, and subject to confirmation by other observers.

Wallis² recommends the following as a palliative application in pruritus ani, after the parts have been well washed with soap and water: Chlorotone, 1 dram; extract of conium, 1 dram; euthymol cream, 2 ounces; a proprietary combination that will hardly be acceptable,

¹ PROGRESSIVE MEDICINE, September, 1901, p. 159; September, 1902, p. 164; September, 1903, p. 133; September, 1906, p. 105.

² Practitioner, London, October, 1911.

more especially since, combined with the washing, it is not likely to be beneficial in the numerous eczematous cases. I think better of another recommendation of his, to use a calamine lotion, either simple or modified, as follows: Calamine, 1 ounce; zinc oxide, 1 ounce; liquor carbonis detergens, 1 ounce; glycerin, 1 ounce; lime water and orange flower water, each 4 ounces.

If it is proper at all to speak of the treatment of a symptomatic condition, the rules governing that of pruritus ani are very simple. The first thing to do is to search thoroughly for a cause, and to attempt to remedy it if found. It may be that thread worms, or a fistula, a fissure, or an ulceration may be present; the itching will not cease until they are cured. This is not the place to detail the measures that may be necessary; but with a careful use of any of the modern proctoscopes they should not be overlooked. Hemorrhoids are a common cause of the symptom, and require appropriate treatment. If eczema of the anal or perianal region is present, either as the primary or as a secondary condition, a 3 to 10 per cent. calomel-lanolin ointment will give as much relief as anything that I have tried. A small percentage of menthol, thymol, or carbolic acid may be added for its antipruritic effect. If there is no apparent local cause for the itching, the general conditions must be inquired into. Diabetes, chronic constipation, intestinal putrefaction, etc., demand appropriate treatment. Some regulation of the patient's hygiene and diet may be advisable, more especially in regard to restriction of the use of stimulants, tea and coffee, and tobacco; but I have not observed any very great effect from these measures.

In a certain proportion of cases, however, none of these underlying conditions will be found, and we are dealing with what is apparently a pure neurotic pruritus. Hygiene, local and general, including under the former term the most scrupulous cleanliness after defecation, the use of olive oil and cotton rather than dry paper for that purpose, are our main reliance. Of local measures, we have a superfluity. Painting the affected area at intervals with a 10 to 20 per cent. silver nitrate solution, or with pure carbolic acid, or the use of chloral, menthol, or thymol ointments, have given me the best results. The x-ray certainly has a powerful antipruritic action in certain cases, and has done me good service; but it has failed entirely in others. Finally, surgical removal of an area of the affected skin may be undertaken; but this is a means of last resort, and is to be advised only in the most absolutely recalcitrant cases.

Sporadic Leprosy in the United States. The existence of isolated cases of lepra in various parts of our country is now a well-recognized fact; I have several times met one in the street here; it was possible two years ago, at a meeting of the Manhattan Dermatological Society to collect 8 cases from among the clientele of the members for a demon-

stration; and the total number in the United States must be several hundred. There must be many concealed cases, since in no disease is the incentive and opportunity for concealment in the earlier stages greater. Some years ago in this review¹ I published the record and picture of a case of very marked tubercular leprosy in which the face, as well as the body, was affected, and which had yet remained unrecognized for years in a crowded tenement house district of this city. The diagnosis, even in the early stages, is rarely a matter of difficulty; even in the well-known early cases the disease was recognized by everyone who saw it with the exception of the one dermatologist who denied the presence of the affection.



FIG. 26.—Sporadic tubercular leprosy. Dr. Brayton's case.

In almost every case, however, the lepers have been either of foreign birth, and have come from the Baltic provinces, Southern Italy, Norway, China, or other regions where the disease is endemic; or the affection has occurred in persons who have acquired the disease during a long residence in such places. Cases developing here are so extremely rare

¹ PROGRESSIVE MEDICINE, September, 1903, p. 145.

as to be almost unknown; so that the one reported by N. W. Brayton is of importance.¹ The patient was a colored woman, aged sixty years, born in Tennessee, who had lived in that State and in Indianapolis all her life, and who had never been farther north than Chicago or farther south than Chattanooga. There had never been any similar affection in her family or those with whom she had associated. The affection began five years before. She was first examined by Drs. A. W. and N. D. Brayton, on December 19, 1911, and showed well-marked clinical signs of acute, nodular leprosy. Besides the anesthetic tumors with which her body was covered, and of which some idea may be gotten from the accompanying photograph of her face (Fig. 26), there were erythematous patches on her legs which were hyperesthetic, a thickening of the left ulnar nerve, alopecia of the lids and brows, and the lepra bacillus was readily demonstrated in the smears from an excised nodule from the ear. On January 1, 1912, Dr. Ralph Hopkins, of New Orleans, the visiting physician of the Louisiana Leper Home made a very thorough examination of the case at the request of the Indianapolis Board of Health. The diagnosis was absolutely confirmed, though the case was considered a remarkable one on account of the rapid growth, multiplication, and confluence of the leprous nodules. A very careful examination of the other members of the patient's family and of others that she had come in contact with failed to reveal any source of infection or any other case. The only etiological point of any interest that could be elucidated was the fact that she had been for many years in the habit of eating salt mackerel and herring, and other preserved and dried sea fish. This, as Brayton remarks, may be of interest to believers, if there be any such, in Hutchinson's suggestion that the eating of infected fish products may be the cause of the disease.

Lichen Planus in the Negro. Some years ago² I had occasion in these pages to refer in a general way to the dermatoses of the colored race; and since that time various observers have devoted attention to the subject. The facts that negroes, as a rule, are less mindful of lesions and abnormalities of their skins that do not occasion actual pain than are whites; that the pigment in their skins to a certain extent masks the ordinary phenomena of the erythematous and inflammatory dermatoses; and that the great mass of the colored population are in the country districts of the South, where they naturally receive less careful medical attention than the whites and those dwelling in the towns; these are sufficient explanations of the comparative ignorance of our American dermatologists regarding the dermatoses of a race that numbers one-eighth of our entire population, and which astonished our foreign visitors at the International Dermatological Congress a few years ago. Of special interest, therefore, is the case of lichen planus

¹ Journal of the American Medical Association, March 9, 1912.

² PROGRESSIVE MEDICINE, 1908, p. 119.

admirably recorded and pictured by Kirby-Smith;¹ though I do not agree with him as to the rarity of the affection. The contrary, in fact, is the case; as I stated in the review of 1908, keloid, leukoderma, and lichen planus are affections to which the colored race is specially prone, while cancer is rare. Probably the reasons why the three first mentioned affections are so frequently recorded in the history books of dispensaries with a large colored clientele is the marked and permanent deformity associated with keloid and leukoderma, and the intolerable itching and extreme chronicity of lichen planus.

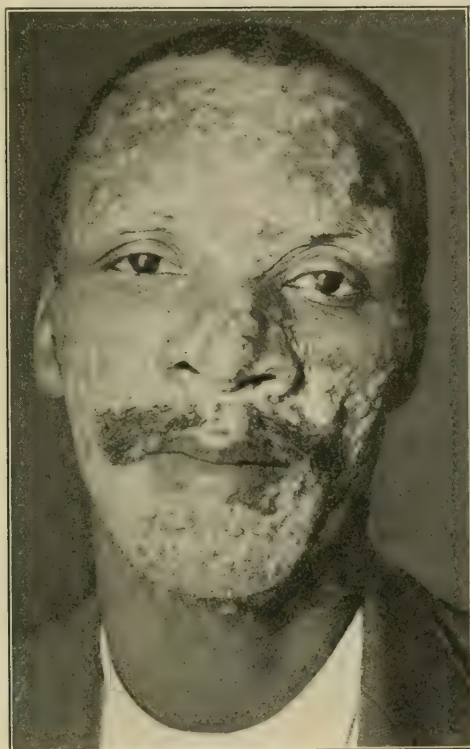


FIG. 27.—Lichen planus in the negro. Kirby-Smith's case.

Kirby-Smith's case was unusual in its extent and severity, and his face was affected to such a degree that his affection might well be mistaken by a casual observer for syphilis or leprosy. In fact, the man had been arrested on the street under the supposition that he was suffering from smallpox. The face and the body were covered with flat, shiny, confluent papules; his skin being quite dark, however, the purplish color that is so characteristic of lichen planus was not evident. The mucous membrane of the mouth showed the small white papules

¹ New York Medical Journal, November 18, 1911.

and plaques that are almost always present when a lichen planus is as extensive as this. The lesions slowly disappeared leaving a marked pigmentation behind; this permanent coloration at the site of the lesions is characteristic of the disease, and is specially marked, as might be expected, in the negro. The treatment was the administration of the bichloride of mercury in $\frac{1}{16}$ grain doses three times a day, with the use of the following ointment: Oil of cade, \mathfrak{z} ss; salicylic acid, grains xx; phenol, grains x; diachylon ointment, q. s., ad one ounce.



FIG. 28.—Lichen planus in the negro. Kirby-Smith's case.

Scarlet Red Ointments. In the 1910 issue of this review, this subject was discussed at some length; my conclusions being that the agent was valuable in various sluggish ulcerative conditions. I do not employ it, however, in very extensive ulcerations; and a case recently reported by Gurb ski¹ would show that it is not devoid of danger. He employed an 8 per cent. ointment in a burn of the right leg and thigh in a girl, aged eleven years. Fifteen hours later there was vomiting, abdominal pain, temperature up to 39.1° C., pulse of 110, cyanosis of the lips, and traces of albumin in the urine. These symptoms soon disappeared when the dressing was changed; that they were due entirely to the ointment

¹ Medycyna i Kronika lek., 1910, No. 41.

is shown by the fact that they all reappeared when it was used again fifteen days later. The picture was that of an anilin poisoning caused by the amido group NH.

The Treatment of Sycosis. This ancient designation for various inflammatory affections of the bearded face would be well abandoned, including as it does such various affections as eczema of the beard, ringworm of the beard, and pus infection of the hair follicles. Its vogue is such, however, that it seems almost impossible to displace it by a more scientific nomenclature; and we may retain it provided we clearly understand that it means a suppurative folliculitis or perifolliculitis pure and simple, and not a ringworm of the beard or trichophytosis barbae, or an ordinary eczema of that part. Of course, all such terms as parasitic and non-parasitic sycosis to distinguish ringworm from folliculitis should be avoided, since the pus organisms are parasites as much as the trichophyton is.

Sycosis or folliculitis of the beard is an obstinate and distressing affection, lasting for years, entailing great and permanent scarring and disfigurement, and often preventing the patient from earning a living. The treatment that I am in the habit of employing is simple and rational, but unfortunately it necessitates skilled attention, and I usually send these patients to the hospital for a time. After the parts are thoroughly cleansed by means of oil applications, thorough epilation of all the affected areas and the skin for a quarter of an inch beyond is effected. This can be done with the forceps in a few days when sufficient assistance can be obtained; it is not nearly as painful as would be supposed, since most of the affected hairs are either loose in pus sacs, or the folliculitis has advanced far enough to detach the hair from the papilla. In very sensitive cases, epilation under general narcosis is undertaken, two expert operators being set to work and the affected areas being rapidly cleaned off with broad-bladed epilating forceps. If the local inflammatory reaction is marked, as it may be, a boric acid wet dressing is applied for a day or two. As soon as possible, however, a bichloride dressing is used, care being taken to make it as near occlusive as possible. The strength of the application must be governed by the susceptibility of the patient's skin; 1 to 2000 is about the average, though some patients stand more and others less. In a week or ten days unaffected hairs begin to appear; and the treatment thereafter consists of careful washings with antiseptic solutions, and the use of mild antiseptic ointments or wet dressings. The whole time of treatment, even in a bad case that has lasted for years, is rarely over three weeks.

In many instances, however, this hospital treatment is impossible; and here the zinc ionization, to which attention has recently been recalled by Gauducheau,¹ is applicable. The hair is cut short with the

¹ *Annales de Dermatologie et de Syphiligraphie*, May, 1911.

scissors, all pustules are opened, and the entire affected area is thoroughly cleaned with soap, alcohol, and ether. A 2 to 3 cm. thick layer of cotton that has been thoroughly soaked in a 1 to 2 per cent. warm zinc chloride solution is then laid on the part. On this is placed the naked zinc electrode which is attached to the positive pole of the battery, the negative pole being put in contact with the skin at any convenient place. The galvanic current is allowed to pass through the body for from twenty to thirty minutes, its amount being kept down just within the limits of pain. A milliamperemeter is not necessary, the patient's sensations being a sufficient index. The current carries the zinc into the tissues. After the treatment, small sloughs appear at the follicle mouths; and when these fall off they carry the infected hairs with them. Four to ten sessions are usually all that are required; the same region, however, must not be treated more than twice a week. Gauducheau reports very good results from this method.

Vaccine Therapy in Dermatoses. I have said something last year¹ on this subject in connection with the use of acne bacillus suspensions; and I see no reason to modify the criticisms there made, the results from the treatment in acne and other affections being indeterminate or unsatisfactory in most men's hands. Nevertheless, Engman, the protagonist of the method in this country, and others have stated repeatedly that non-success has been due to imperfection of method; and in view of that fact it seems only fair to present the views of those who do believe in the efficacy of the treatment. Alderson² has recently published a series of the familiar "don'ts" in vaccine therapy that well represents the views of its advocates. He says, that from time to time one hears the vaccine treatment of certain skin diseases adversely criticised by physicians who have been disappointed with their results; he has frequently seen patients who have previously been given vaccines by their physicians in an empirical manner, with the inevitable bad result and the consequent discrediting of the method. He dedicates the following "don'ts" to these practitioners, in the hope that their due observance may be the means of preventing some future failures. He bases them on considerable personal experience and success with the method, and reports from other practitioners:

1. Do not expect to see good results unless the vaccines are used in accordance with certain established rules; only disappointment can result from empiricism.
2. Do not use vaccines to the exclusion of all other methods.
3. Do not use an emulsion over three months old.
4. Do not use a monovalent stock vaccine if a polyvalent preparation can be obtained, and do not use either if an autogenous vaccine is available.

¹ PROGRESSIVE MEDICINE, September, 1911, p. 97.

² California State Journal of Medicine, September, 1911.

4. Do not overwhelm the patient at first with too large doses, and do not increase the dosage too rapidly.

5. Do not inject too often; this is a common error which is responsible for many disappointments.

6. Do not inject vaccines in the treatment of the average case of acne furunculosis, or staphylococchia more often than once in seven or ten days. Be guided by the clinical signs.

7. Do not forget that during the two or three days following a proper injection the negative phase is present, and that during this phase lesions should not be manipulated or interfered with in any way. Usually after the fourth day, if the dose has not been excessive, the positive phase begins to develop, and then local treatment can be carried on advantageously.

8. Do not forget that much manipulating of lesions can have an effect similar to an injection, and in that way can complicate the negative phase.

9. Do not fail to observe that a marked increase in lesions during the first two or three days following an injection is evidence that too large a dose has been injected, or that the lesions themselves have been interfered with, or both.

10. Do not repeat the injection for some time if the negative phase, as shown by the objective signs, persists; and then when the injections are again resumed proceed cautiously with small doses.

11. Do not use the same region for repeated injections; change the site often.

12. Do not condemn the method if your results do not equal your expectations, but carefully determine whether or not you have carried it out properly, and you will probably find some error in your technique.

Alderson's criticisms are to some extent justified; I know myself of more than one instance in which the vaccines have been used with a recklessness and disregard of rules that rendered failure inevitable. Nevertheless, the results obtained by specialists, who must be trusted, if anyone is to be, to carry out treatment on the proper lines, have been, to say the least, entirely indeterminate. My own conclusions are in accord with those of most dermatologists who have expressed themselves publicly or privately on the subject. I have seen good results in cases in which the vaccines have been used in conjunction with other approved methods, as Alderson says, they should always be employed; but as I have seen exactly the same good results in similar cases treated in the same way without using the injections, I am quite unable to say that these latter have had any special effect. On the other hand, in a few cases that were entirely resistant to other methods, I have felt justified in using the vaccines alone; and I have gotten no results at all. It is really begging the question of determining the efficacy of a new remedial procedure when its advocates insist on our

using at the same time measures of acknowledged and general efficacy in the disease that is being treated, and warn us never to use the vaccines without the other remedies. It may be better or even necessary to use both together; but some efficacy of its own must be proved for the vaccines before they can be accepted; and there is no practical way of ascertaining whether they have it without using them alone. At the very least, as matters stand now, the verdict on the value of vaccine therapy in dermatoses must be the Scotch one of "not proven."

SYPHILIS

The Abortive Treatment of Syphilis. I have always been of the opinion that the abortive treatment of a luetic infection was a possibility, and that neither unfavorable statistics nor authoritative statements should make us cease our attempts to effect it in suitable cases. There must be a time, no matter how short, during which the infection is local only; and it must be possible, though perhaps only in the rarest cases, to destroy the virus *in situ*, or to prevent its spread into the system. The measures to be taken to that end cannot be gone into here; they may be found in detail in my article on the subject in *Modern Treatment*.¹ They consist of excision of the chancre, and the very early and vigorous employment of local and general antisymphilitic remedies, including the newer arsenical preparations. All the arguments in favor of the attempt have renewed force in view of the facts that we now possess, in the microscopic recognition of the spirochete, and additional means of diagnosing the chancre at its very earliest stage; and hence, we can now hope to attack an initial lesion very much earlier than was formerly the case. I have myself succeeded at least once in aborting an undoubted syphilis by means of excision of the initial lesion. Recent experiences in this line are, therefore, of the greatest interest.

Audry,² without going into details of his cases, is very decided in his opinion as to the possibilities of abortion, and makes a plea for its attempt in every suitable case. Grunfeld³ subjected 46 carriers of a syphilitic initial lesion to an abortive treatment consisting of excision, if possible, local mercurial applications, and an intensive mercurial medication by injections of gray oil, or of the salicylate of mercury. In 5 of these cases no evidences of syphilis, including no positive Wassermann reaction, could ever be gotten afterward; the oldest of these cases went back three years; the others were from two to eight months date. And in the cases in which secondary symptoms did appear in

¹ *Modern Treatment*, Hare, vol. ii, p. 102.

² *Province médicale*, January 7, 1911, p. 5.

³ *Archiv für Dermatologie und Syphilis*, 1911, p. 457.

spite of the abortive treatment, these latter were notably retarded and of slight severity. He did not employ arsenobenzol in any of these cases. Knauer¹ used salvarsan for abortive purposes in 19 cases, 14 of which could be kept under observation for from four to six months. Five of these showed symptoms of systemic infection, 1 showed a positive Wassermann reaction; 1 has still an induration of the initial lesion at the end of three months; 5 others had indurated cicatrices at the site of inoculation, with a negative Wassermann. Scherber² has practised excision frequently, but reports success in some cases only. Excision, which he has done frequently, was successful in one case only. The sclerosis was removed on the 17th after the infection; and during a period of observation of seven years there were no further evidences of disease. After the publication of the Levaditi spirochete method, the specimen was examined, and the organisms were found present in abundance. Of 25 cases subjected to a most energetic early treatment and carefully observed for from two to four years, 6 remained entirely free from secondary symptoms.

General Paresis, Tabes, Syphilis of the Nervous System, Psychoses. This subject is still an obscure one, due partly to its inherent complexity and partly to the fact that while the specialist in the neurological or the syphiliological field meet with them not uncommonly, they are of rare occurrence in general practice. Their importance, however, is manifest, more especially from the therapeutic point of view.

Chodzko³ has made a careful study of 14 of these cases in the hospital of Kochanowka, in Russia. Eleven of these were between the ages of twenty and twenty-four, emphasizing the fact that the youthfulness of the patients is an important feature in the differential diagnosis from non-syphilitic psychoses. The symptoms appeared from one to fifteen years after the infection. The Wassermann reaction was in all cases positive. A feature of the utmost importance was the unusual variability and metamorphoses of the symptoms, so that no cases gave the usual and classical symptoms of the definite maladies; and another was the comparatively sudden onset of the aberrant phenomena. The author follows the classification of Nissl, distinguishing between the inflammatory psychoses (with anatomical meningitis), the non-inflammatory (endarteritis luetica), and the combined cases (meningitis and endarteritis). A useful general review of the entire matter is contained in a recent paper of Fisher's.⁴ He recognizes syphilis as the cause of all these affections, syphilis of the nervous system being the expression of the direct invasion of the nerve structures and the bloodvessels by the spirochete, while in paresis and tabes we are dealing

¹ Wiener klinische Wochenschrift, 1911, p. 384.

² Dermatologische Zeitschrift, 1911, Nos. 5 and 6.

³ Neurologia pol., 1910, Heft ii.

⁴ Journal of the American Medical Association, December 30, 1911, p. 2134.

with the remoter after-effects of damage done by the organism in the past in the shape of fibrous degenerative changes. The former lesions are, therefore, directly syphilitic; the organism can still be found, and the blood reaction will be positive. Paresis and tabes, on the other hand, do not show the presence of the organism, and the Wassermann reaction may or may not be positive. The author places the proportion of cases of syphilis that show the early direct nerve tissue lesions at from 5 to 10 per cent. of all cases; and about the same proportion of infected cases show the later or parasyphilitic changes that manifest themselves as tabes or paresis. The first five years *post infectum* is the time for the appearance of the early set of symptoms; while ten or more years usually elapses before the parasyphilitic affections appear.

The pathology of these conditions is essentially the same, the variations in the findings being due to the different stages of the local changes, and the part of the nervous system involved. The earlier direct lesions are inflammatory, involving the bloodvessels, more especially of the base of the brain, and the membranes. In paresis, the cerebral membranes, and especially the pia, is involved; and so also is the cerebral cortex, involving the cortical cells or neurons. In tabes, the initial lesion is in the spinal ganglion and the neurons of the posterior column. In both affections, the cranial nerves may be involved.

The symptomatology of these affections varies widely, of course, in typical cases. In a general way, the early syphilis of the nervous system gives local symptoms, cerebral paralysis, focal epileptic seizures, cranial nerve lesion signs, transverse myelitis, etc. In tabes, there is the history of pain, or anesthesia, or of vesical weakness, or inconstancy of gait, the Argyll-Robertson pupil (frequently appearing very early), and there are usually no mental symptoms; the disease lasts ten or twenty years, unless some intercurrent complication, as a cystitis, abruptly ends the case. In general paralysis, the mental signs are prominent; there is depression or dementia in the earlier stages, with grandiose or exaggerated delusions of power, strength, riches, etc., later. The spinal cord is involved in time, but no motor symptoms; and the spinal signs are never so prominent as they are in tabes.

The author has little to say in regard to treatment; salvarsan, in his opinion, is quite as ineffective as mercury and iodine in tabes or general paresis; in early cerebral syphilis it sometimes acts more effectively than these latter drugs. Whether it has any effect in preventing the later nerve lesions occasioned by the luetic infection is, of course, still a moot question.

"606" Accidents and Deaths. It is certainly not the least important of the functions of a yearly review, such as this, to present to the reader a true picture of the status of a remedial procedure as it is gathered from the personal experience of the author and from the results, published and unpublished, that it is his business to collect

and weigh. It is perhaps not too much to say that the subject of the treatment of syphilis by means of arsenobenzol is the most important practical therapeutic measure that has been proposed to the profession in recent years. The extreme commonness of a disease with which we all have to deal; the extravagant claims that have been made and are still being made for the remedy; and the amount of professional and extra-professional advertising that the procedure has gotten; the importance of the decision as to its use in many cases; all these considerations render it necessary to decide as early as may be possible as to the merits and demerits of the drug. And while many important questions regarding it are as yet undecided, and must necessarily remain undecided for years to come, an experience of scores of thousands of injections ought to be sufficient to enable us to form definite judgments on certain most important points. It may be confidently affirmed, for instance, that while arsenobenzol has been established as a remedy of very great value in the treatment of syphilis, it does not cure the disease any more than do the older drugs; that mercury and iodine have not only not been displaced by it, but the best opinion, even among those most enthusiastic for it, emphasize the necessity for energetic mercurial medication at the same time; that, like mercury and iodine, it fails in certain cases; and that there are important contraindications to its use, so that it cannot be regarded, like the older drugs, as a universal remedy to be used in every case. *Nil nocere*, do no harm, is a precept of special importance when dealing with a procedure of serious moment in the endeavor to avoid or obviate other harm. And when, as is here the case, therapeutic enthusiasm breaks all bounds, and the mass of the profession seem to accept the claims of advertising agents as truth, it is specially incumbent in this review to place the matter in its true light, so far as our present knowledge goes. To prevent, however, as far as I can the almost inevitable misconception to which these words will give rise, let me reiterate my conviction that salvarsan is a remedy of great value in many cases, though not a cure for syphilis, not applicable to all cases, and by no means an entire substitute for mercury and iodine. It remains for us to determine its contraindications, limits, and dangers.

The list of all these latter is already a long one, so that there can be no doubt at all that it is incomparably more dangerous than mercury. It has been in general use less than two years; and already the list of accidents and fatalities is so long that their collection would be arduous. Thus Jacquet¹ reports a death following injection; there was an ulcer of the stomach, diagnosed only at the autopsy. Finger² reports several cases of Martius' dying two to three weeks after injections.

¹ Monatshefte für praktische Dermatologie, April 15, 1911, p. 436.

² Wiener klinische Wochenschrift, 1911, No. 2.

Morata¹ saw vomiting, diarrhea, and sweats, with a hardly perceptible pulse and anuria until death occurred in three days in a case. Jorgensen² has reported a fatal case, and Gaucher³ 2; and Westphal,⁴ 1 of tabes in which the patient died in a few hours. Balzer and Condat⁵ report a fatal meningo-encephalitis after two intravenous salvarsan injections. Leredde and Kuenemann,⁶ in a critical study of 468 intravenous injections in which untoward happenings occurred, found 55 deaths in the series; 25 of these the authors attribute directly to the drug, 7 were doubtful, and 23 occurred from causes independent of it. Two deaths have occurred after salvarsan injections at the City Hospital here; one was not on my service, and has not to my knowledge been published, so that I cannot vouch for the exact facts; but it is believed that the exodus a few days after the operation was due to the injection. The other was in an otherwise exceptionally healthy woman, aged forty years, who had been given an injection just before I took charge for a small tertiary ulceration of the back, which would have healed under the local use of a mercurial plaster. She died comatose at the end of the third week, having had renal symptoms only during the last three days. The autopsy showed entirely healthy organs, with the exception of a recent nephritis, and acute degeneration of and hemorrhage into the cardiac muscle. In the opinion of the pathologist, the cause of death was undoubtedly arsenical poisoning. I have heard of a number of other unreported deaths here, both in public and in private practice.

Now, of course, not all of these deaths were due to the drug; a number of them occurred in cases already suffering from very serious or necessarily fatal affections; and some occurred in cases where contraindications existed, and the remedy should never have been used at all. But the eager thoroughness with which the records of every case of the kind is overhauled and dissected by the enthusiastic advocates of the remedy, and the manner in which even the most trivial facts are seized upon in the attempt to attribute the fatality to other factors or to the syphilis itself, savors rather of the special pleader than of the earnest searcher after truth. It must be remembered also that the number of injections given is now many hundred thousands, and that the proportion of fatalities is a very small one so far as figures go. But the fact remains that the record is a very serious one. That a remedial procedure should have many scores, or even some hundreds, of deaths attributable to it within the first two years of its general employment is certainly subject for thought, and justifies us in caution in recommending it

¹ *Rev. Espan. de Dermat. y Syph.*, April, 1911.

² *Medicinische Klinik*, 1911, No. 10.

³ *Bulletin de la Société de dermatologie et de syphiligraphie*.

⁴ *Dermatologisches Centralblatt*, October, 1911; January, 1912.

⁵ *Bulletin de la Société de Dermatologie et de Syphiligraphie*, January, 1912.

⁶ *Ibid.*

for general employment. Mercury has its deaths, undoubtedly, for there are idiosyncrasies to all drugs given in any form; but the list does not begin to compare with that from salvarsan.

Of the non-fatal accidents from the drug, I shall have little to say, though some of them have been serious enough. They include such occurrences as severe nephritis, as recorded by Gottheil,¹ Weiller,² and Fruhwald;³ venous thrombosis by Darier and Cotonet,⁴ and Gaucher and Gougerot;⁵ convulsions and collapse by Gilbert;⁶ bilateral ocular paralysis by Makrocki;⁷ epileptic attacks by Gilbert;⁸ zoster by Bettmann⁹ and Mayer;¹⁰ optic neuritis by Gottheil,¹¹ and other observers; what are called "neurorecedives" by numerous writers, but which I believe to be direct poisonous effects of the arsenic, etc. All these things led Leredde and Kuenemann, in the paper above quoted, to warn the profession against the indiscriminate use of "606;" and in the discussion, in the Société de Dermatologie et de Syphiligraphie, that followed its reading several prominent members reiterated the warning. Ravaut stated that the accidents after the injections were much more frequent than was usually supposed; Milian claimed that it was a "colossal imprudence" to employ the same dosage for intravenous as for intramuscular injections; he gives 10 to 30 centigrams at a time, repeating the injection, if necessary, and always giving mercury at the same time and getting excellent results. Brocq, though a partisan of arsenobenzol, said that he was dismayed at the martyrology that it had occasioned; mercury, though so much older, had far fewer deaths to its discredit. Leredde proposed to give a full dose to patients who were healthy, and a much smaller one to those in whom there were contraindications; to which Brocq replied that the trouble was to decide to which class the patient belonged in many cases, since the contraindications were so numerous and often so obscure. Finally, Levy-Bing admitted that he never administered the drug without apprehension.

Some account of the contraindications mentioned above would be in place in a review of the deaths and accidents due to the drug. Unfortunately, it is extremely difficult to do this. Apparently, whenever an accident or a fatality has occurred in which none of the older and accepted contraindications was found, a new one is discovered. Organic disease of any of the internal organs is regarded by some observers as

¹ Medical Record, December 31, 1910.

² Münchener medicinische Wochenschrift, 1911, No. 15.

³ Ibid.

⁴ Bulletin médicale, 1911, p. 278.

⁵ Bulletin de la Société de dermatologie et de syphiligraphie, January 12, 1911.

⁶ Münchener medicinische Wochenschrift, 1911, No. 7.

⁷ Dermatologisches Centralblatt, October, 1911, p. 22.

⁸ Ibid.

⁹ Deutsche medicinische Wochenschrift, 1911, No. 1.

¹⁰ Medicinische Klinik, 1911, No. 3.

¹¹ Medical Record, December 31, 1911.

a contraindication, and certainly any disease of the kidneys, heart, or bloodvessels. The trouble is, of course, that syphilis itself occasions these lesions, and arsenobenzol is directly indicated if such is the case. Any lesion of the ophthalmic or other nerve of special sense is a contraindication, if it is not due to the syphilis. Late syphilis of the nerve centres does not seem to be, in itself, a contraindication; but the consensus of opinion as to the entire inefficacy of arsenic, or of any other drug, after organic changes of the nerve structures have occurred renders arsenobenzol useless in these affections. The safest rule for the practitioner to follow is to regard any abnormality not directly due to the luetic poison as a contraindication to the employment of the arsenic.

When we consider that, in addition to these limitations to its employment, it is admitted, even by the enthusiastic advocates of the new drug, that its use does not do away with the necessity of a systematic mercurial treatment, and that the best practice today consists of the administration of both of them, it is evident that the role of arsenobenzol in the treatment of syphilis is undergoing the modifications inevitable with a new therapeutic procedure. A single dose, or several doses, of "606" cannot be expected to cure the syphilis; mercury and iodine must be used *secundem artem* to give our patient's the best chance of overcoming the virus. What then shall be the practitioner's position when confronted with a case and called upon to decide as to the course of treatment to be pursued?

As the new treatment has some dangers, as above shown, and as the intravenous method of administration, now the favorite one, is of some technical difficulty and is not suited for office use, it seems to me that the older methods, which are harmless and readily employed, must still remain the main reliance of the general practitioner in the treatment of the malady. A beginning case, or one that has proved obstinate in the face of the ordinary remedies, or in fact, anyone in which an energetic and intensive treatment is desirable, should have one, two, or three intravenous or intramuscular arsenobenzol injections in addition to the regulation treatment; provided always that the patient is otherwise in perfect health, that he understands that the procedure is practically an operative one and necessarily involves some though little danger, and that it can be undertaken under proper conditions and with the requisite precautions.

A final word as to these conditions and precautions. Arsenobenzol injections should not be given in the office to ambulant patients. It is done, I know; but accidents have occurred, and certainly one would not give an ordinary saline transfusion in the office and allow the patient to walk away a few minutes later. The patient should be in bed for a day or two at least, and under proper supervision. The operation itself, whether intramuscular or intravenous, should be carried out

with all the care and precautions of a surgical measure. The patient should, if possible, be under observation for two weeks after the injection.

Leukoplakia. It is a number of years since this subject was last treated in these pages;¹ and though but little advance has been made, either in our knowledge of its pathogenesis or in its successful treatment, it will be well to consider the most recent views on the subject.

On the vexed question of etiology, opinion is gradually coming around to the conclusion that a syphilitic infection, either hereditary or acquired, is the causative factor. It is, however, distinctly a post-syphilitic change, and is no more amenable to antisypilitic treatment in most cases than are similar lesions in the internal organs. On the other hand, the evil influence of irritation, and especially that of tobacco, cannot be gainsaid. It is not, however, a causative factor; for leukoplakia occurs in locations other than the mouth, as in the vagina, on the glans penis, etc.

Mercury internally is indicated in every case, no matter what the serum reaction may be. Iodine is not to be used, since that drug favors epithelial proliferation, and epithelial proliferation and degeneration is the chief danger inherent to these growths. And in spite of the good results that have been reported from various quarters, it is my present belief that arsenic should be used with caution, if at all.

Constantin² has reported recently on 10 cases of the kind, 1 of which had already begun to undergo carcinomatous degeneration. He got good results in a certain proportion of them from the high frequency current, applied under local anesthesia.

The Local Effects and Ultimate Fate of Salvarsan in the Body. Next to the therapeutic results, these are the most important considerations in connection with the new syphilis treatment. Is the arsenic rapidly excreted from the body? Is it slowly absorbed and passed out? If it remains deposited in the tissues, for how long a time does this persist, and what are the conditions that favor or retard the process? With the intravenous administration of the drug we know that it is very rapid; that in a few hours or a few days at the most the arsenic poured into the general circulation disappears from the urine; and not the immediate therapeutic results that are common and the poisonous symptoms that have occurred in a number of cases show themselves in a very short time. This does not exclude the possibility, of course, of there being after-effects from this method which we will learn in the future; but we are concerned at present with the action of the drug when used in its commonest manner, as an intramuscular injection.

Lovejoy³ has studied the histological changes occurring at the site of the injection. That these are always of the nature of a local necrosis

¹ PROGRESSIVE MEDICINE, September, 1903, p. 148.

² Annales de dermatologie et de syphiligraphie, 1911, No. 2.

³ Journal of Cutaneous Diseases, July, 1911.

has been evident to us from the first. In my earliest series of injections, made in the fall of 1910, and in which the suspension was employed, the occurrence of large, persistent, and pain indurations, which, in some cases, sloughed or had to be excised, demonstrated the fact clearly. The entire mass of tissue was black and dry; necrosis occurred. I am firmly convinced that the same takes place, though in less degree, with the improved solution and site now selected. In Lovejoy's case ulceration had occurred, and the tissue examined was taken from the indurated base of the ulcer four months after the injection. The microscopic sections showed large numbers of granules of "606" lying in communicating locules that had apparently been formed mechanically by the pressure and force of the injection. The tissue surrounding these spaces showed abundant evidences of advanced degeneration; the elastin had disappeared, and the fibrous tissue was increased. That the "606" was the cause of the necrosis was shown by the facts that both bloodvessels and lymphatics were filled and blocked with granules of the metallic substance, and the vessel walls were thinned and degenerated. There were absolutely no evidences of inflammatory reaction; so that the injected area was simply a dead foreign body.

Similar findings have been reported by Orth, Fischer, v. Torday, Martius, and others. Scholtz and Salzberger¹ have recently gone very thoroughly into the matter, examining the lesions left after the alkaline, neutral solutions, and the various forms of watery and oily suspensions at different periods after the injections. They found that, with all of them, marked necrosis was present twenty-four hours after the injection. Muscles, nerves, vessels, and all the tissues of the parts affected were involved. The vessels were found completely thrombosed within that time, so that the area containing the arsenobenzol was completely cut off from the circulation. They found that, with the neutral or oily suspensions especially, there was little apparent change in the deposited material in twenty-four hours; and that even after the lapse of two and four weeks large amounts of it remained in the tissues. Hence, it is apparent that only a small part of the arsenobenzol injected into the muscles is absorbed during the first few days or weeks after the injection.

It is a question, under these circumstances, how much of the drug reaches the circulation as dioxydiamidoarsenobenzol, and how much of it, like other arsenical combinations under similar circumstances, is slowly changed into ordinary arsenous acid combinations, and as such absorbed into the system. In the opinion of Scholtz and Salzberger, it is only the very small amount that reaches the circulation the first day that does so. The intramuscular injection treatment with arsenobenzol is thus apparently exactly similar to that with insoluble

¹ *Archiv für Dermatologie*, April, 1911, p. 160.

mercurials; a large depot of the material is established in the tissues, from which, for days and weeks, a slow conversion into a soluble and absorbable salt goes on. The treatment is, therefore, entirely in line with that which has been found most efficacious for mercury, and is most reasonable in view of our knowledge of the pathology of syphilis. It is directly opposed in principle to that by intravenous injection, in which a very large dose of the drug is thrown directly into the circulation, to disappear from the body entirely within a very few hours. It may well be that future experience will teach us that the best way to administer arsenobenzol is by means, of course, of much smaller intramuscular injections, precisely as is the case with mercury.

The radiographic investigations of Ullmann and Haudek¹ have led them to similar conclusions. The permanence of the metallic infiltrate could be demonstrated weeks after the injection.

Tryb² has investigated histologically a series of cases in which both subcutaneous and intramuscular injections had been done. He found that there was degeneration of the fibrillæ of the muscle bundles far beyond the necrotic area where portions of the drug remained. Surrounding this was always a dense mass of connective tissue, showing a true encapsulation of the remnants of the foreign body. It will be interesting to learn in time the ultimate fate of these masses.

The Fate of Heredosyphilitic Children. Manifest difficulties stand in the way of investigation of the ultimate results of hereditary syphilis. The children that survive fall into hands other than those that observed the earliest symptoms or treated the parents; the patients themselves naturally do not know the family history, and the parents themselves forget or falsify the facts. The 37 cases, therefore, that Bering³ has been able to follow up and study form an important contribution to our knowledge of this interesting question. They were all instances of syphilis hereditaria tarda; that is to say, of intra-uterine infections in which symptoms of hereditary lues showed themselves later in life, no matter whether the child had had early symptoms of infection or not.

Of these 37 undoubted cases, the evidence as to syphilis in the parents was absolutely wanting; neither their history, nor the objective examination, nor the serum test showed its presence. This proportion is not astonishing in view of the notorious unreliability of the history in such cases, the mildness of the majority of infections as seen today, and the many limitations of the Wassermann test. In 4 cases only did the father admit previous syphilis, and not one of these acknowledged infecting his wife. In 27 instances, abortions, stillbirths, and diseased infants

¹ VIII Internationaler Physiologen-Kongress; Archiv für Dermatologie, April, 1911, p. 548.

² Monatshefte für praktische Dermatologie, April 15, 1911, p. 405.

³ Archiv für Dermatologie, March, 1911, p. 17.

were admitted by the mother, and 6 mothers knew the fact of their infection. It is a notable fact that only 8 out of all the mothers gave a positive serum reaction; and every one of these 8 was entirely free from any evidences of present or past syphilis. All these things show conclusively the uselessness of attempting to draw conclusions as to the nature of a given lesion in the young from the history or examination of the parents.

The average age at which the late heredosyphilitic symptoms appeared was eight; the earliest was at the end of the first year, and the latest was at the age of twenty-six. In 26 of the 37 cases, the presence of such marks as radiating scars, or Hutchinsonian teeth, showed that the lesions then present were not the first heredosyphilitic ones from which the patient had suffered. Excluding 4 cases in which the serum test could not be made, it was positive in 27 out of the 33; giving the high percentage of 73 positive results.

The specific lesions present were: Unilateral or bilateral disease of the knee-joint, sixteen times, in 2 cases of which other joints were also involved; glandular swellings, 19 cases; parenchymatous keratitis, 26 cases; and deformities of the bones of various kinds, 26 cases also.

In the joint cases, the changes were essentially those occasioned by chronic inflammation of the capsule, with secondary, limited, and less important changes in the periosteum and bone. Ten cases were carefully examined with the fluoroscope; 9 of these showed no bone changes at all. The apparent thickening of the bone that is observed in these cases is really due to tumefaction of the capsule of the joint. In 2 cases, the fluid of the swollen joint was subjected to the serum reaction, and was positive in one of them. In almost every case both knee-joints were affected; and, in 11 instances, this bilateral swelling of these joints was the first symptom of the late hereditary disease. This serves to distinguish the affection from tuberculosis; in addition to which it is much more rapid in its course, developing fully in a few weeks; it usually gives a positive Wassermann serum reaction; and the various tuberculin tests are negative.

Glandular swellings were present in 19 cases; most often the cervicals were affected. They were precisely similar to the glands seen in acquired syphilis.

Parenchymatous keratitis, which is due in at least half of all cases to heredosyphilis, was present in 26 cases. Both eyes were usually affected, and the course of the affection was always rapid.

Bone deformities were seen twenty-six times; saddle nose was present in 14, and many cases (number not stated) showed the characteristic saw-bone deformity of the tibiae.

Deafness was present, strange to say, in only 2 cases. It was due to disease of the labyrinth, leading quickly, in a few weeks, or more slowly, in one or two years, to complete loss of hearing. Hutchinsonian teeth

were found in 11 cases. Radial scars on the lips, the remains of papular efflorescences in these locations, and very characteristic of heredosyphilis, were present in 8 cases. It is remarkable that disturbances of intelligence were noted in only 3 cases, 1 of which was a well-developed melancholia.

Taking the 37 cases all in all, the commonest symptom complex was deformities of the bones, together with parenchymatous keratitis or swellings of the knee-joints. The absence of visceral syphilis (one case had an interstitial hepatitis, and another an aortitis) is ascribed by the author to the fact that when there is serious infection of the internal organs in heredosyphilis the patient soon succumbs.

Concluding with a few words concerning treatment, the author states as is universally admitted, that while the keratitis is very amenable to an energetic iodide and mercury treatment, receding quickly and leaving the eyesight almost unimpaired, the bone and joint affections are much more obstinate and relapsing. In 3 cases he used arsenobenzol. In 2 of these it was useless; in the third, with extensive gummas, the therapeutic results were quicker than he would have expected from mercury.

Hochsinger,¹ on the basis of a very rich experience, details his conclusions in two recent papers. In 134 families there were 263 children born living, of whom 208 were observed for more than four years. In general, his conclusions are similar to those recorded above. The prognosis is worse when the heredosyphilitic child has visceral lesion, and especially lesions of the nerve tissues. Of the 263 children, 79 died, 38 in the first year, 15 in the second, and 27 altogether in subsequent years. Not less than 12 per cent. of the cases showed plain evidences of tuberculosis, in addition to those of heredosyphilis. The lesions found in these cases were the following: Twenty-six had manifest syphilitic lesions; 89 had parasyphilitic nervous lesions; 92 showed syphilitic dystrophies; 13 had specific disease of the circulatory apparatus; 15 had marked tuberculosis. The time of observation varied from four to twenty-four years.

¹ *Ergebnisse der inneren Medizin und Kinderheilkunde*, 1910, vol. v; *Wiener klinische Wochenschrift*, 1910, Nos. 24 and 25.

OBSTETRICS

By EDWARD P. DAVIS, M.D.

PREGNANCY

The Diagnosis of Pregnancy. THE EARLY SYMPTOMS OF PREGNANCY. Kehrer¹ draws attention to the changes produced by early pregnancy in uterine, ovarian, and in the glandular tissues of the body. The development of the corpus luteum is a sign of pregnancy, and seems to be a potent factor in the growth of the cotyledons of the placenta.

In response to the general stimulus of this substance, the uterus and adnexa undergo hyperplasia and numerical hypertrophy. This is even true in ectopic pregnancy. Varying views pertain regarding the extent to which the unstriped muscle fibers of the uterus enlarge in pregnancy, although mitosis in the uterine muscle has been observed. Cross-sections of stained uterine muscle give interesting information concerning its development. If the corpus luteum be destroyed during early pregnancy in a pregnant animal, the uterus has been observed to grow smaller and the impregnated ovum to perish. If the same experiment is made in the second half of pregnancy this result does not follow, probably because the villi of the chorion in the first instance are not developed sufficiently to nourish the ovum; while in the second experiment, they are potent to maintain its growth. A similar result follows the removal of the ovaries in the early months of gestation, while if the same procedure be carried out in the later months, pregnancy goes on. Observations show that decidua forms while the ovaries are intact; while if the corpora lutea be destroyed, decidual cells will not develop, except in the connective-tissue cells.

Hypertrophy of the abdominal wall in its muscular tissue and in the region of the linea alba and in the skin, takes place early in pregnancy by the proliferation of spindle-shaped cells and fibers. Where striæ form the connective tissue increases, its spaces widen, and the blood and lymph vessels enlarge, diminishing after labor with the formation of white scar tissue. In different individuals the degree of the growth varies, and also the deposit of fat. It is possible that the excessive fat, and sexual irritability seen in some patients, is the result of excessive production of lutein.

¹ Archiv f. Gynäkologie, 1911, Band xciv, Heft 1.

The milk glands also undergo hyperplasia by epithelial growth in the acini.

Colostrum forms, a process similar to that seen in newborn children of both sexes. This usually ceases in about two weeks. There is reason for believing that this activity is the result of ovarian influence. Some believe that it is caused by chorionic epithelial tissue, as this can be produced by the injection of placental extract. We do not, however, know the exact composition of placental substance. In individuals in whom the ovaries are removed, the milk glands atrophy, showing the relation between ovarian influence and milk secretion.

Periosteal formation of bone, by what are termed "puerperal osteophytes" in the cranium, and chondral osteophytes in the ends of the long bones and in the pelvic bones, are another result of the stimulus of pregnancy. The increase in the weight of the heart, the dilatation of the veins of the pelvis and lower extremities, and of the lymph vessels, the enlargement of lymphatic glands, and increase in red and white blood cells, may be referred to the same source of active origin. The quantity of blood in circulation in pregnancy evidently corresponds to the activity of the various blood-making glands of the body.

The growth of the hair, nails, and other appendages of the skin, the development of pigments, the coloring of the linea alba, and the chloasma of pregnancy, are all indications of this condition.

Excessive increase in the size of the thyroid and other blood-making glands is ascribed to the influence of lutein, and is a common phenomenon in menstruation. The appearance of struma or exophthalmic goitre follows when bacterial toxins enter the blood, usually through infected drinking water.

According to recent investigations, radio-active drinking water produces enlargement of the thyroid. Boiling such water destroys the bacterial toxins, and also the radium in the water, decomposing the lime contents, and thus proving the action of these substances.

Osteomalacia may develop in young women and sometimes in men. The removal of the ovaries causes the pain of this disorder to disappear, and the softened bones to undergo sclerosis.

The advent of labor may be ascribed to ovarian influence, aided by toxins formed in fetal metabolism.

A general survey of these processes in the body of the mother indicates that they are the reaction of the maternal organism against the growing ovum, and protect the mother from its excessive development. The growth of the various portions of the mother's body seems necessary to maintain the increasing development of the embryo.

The worst products of embryonal metabolism are found in the contents of the fetal intestine where meconium contains elements of saliva, pancreatic secretion, bile, and uric acid. In the chorionic villi are found various solids in solution, carbohydrates, and fat. If an exces-

sive discharge of fetal products takes place into the mother's blood, the symptoms of maternal toxemia result through failure in her organs of elimination. This produces icterus in mother and fetus, oliguria, albuminuria, cylindruria, uremia, and eclampsia. This may follow chilling of the surface of the body, or disturbance in the villi of the chorion.

One may divide the symptoms of early pregnancy into those which arise purely from the embryo and fetus, those which arise from the mother, and a mixed or third form in which the mother shows the results of the chemical action of lutein and the waste products of fetal metabolism.

The first produces their results gradually by a process of hyperplasia in the various organs and tissues, which gradually cease after labor. The last develop suddenly, run a rapid course, and usually cease before labor.

In the present stage of physiological chemistry further knowledge concerning the early signs of gestation may be obtained by the administration of lutein from the ovary of the cow or sow. Experiments may be undertaken to determine the best method of obtaining a result from the smallest possible amount injected into the blood by the following methods: the experimental injection of pure lutein in the blood of calves, two or three years old, before the development of signs of successful activity; observations upon the influence of lutein upon the muscular tissue of the bloodvessels, blood tension, and the development of vessels in different tissues; experiments made upon patients suffering from amenorrhea, scanty menstruation, or sterility, by the injection of freshly prepared lutein substance suspended in glycerin from the ovary of the cow. This may be given by the mouth, by the bowel, or by subcutaneous injection. Specially useful is the method of injecting this material into the intestine, which has been previously thoroughly cleansed by irrigation. In this way the changes produced in lutein in the stomach are avoided.

A study of those means which can lessen or inhibit the activity, and the results of lutein. At present, phosphorus is the only substance apparently active, besides the use of the α -ray, radium, and the removal of the ovaries. Investigation should also be made to determine the relative activity of lutein material and that obtained on the villi of the chorion.

THE MICROSCOPIC DIAGNOSIS OF INTERRUPTED EARLY PREGNANCY. Schickele¹ reports 6 cases in which he made a microscopic study of the uterine contents to determine the presence or absence of early pregnancy. These patients had disturbance of menstruation without positive signs of pregnancy, followed by a return of irregular hemor-

¹ Archiv f. Gynäkologie, 1911, Band xciv, Heft 1.

rhage, varying in duration and degree. They were subjected to curetting, and a microscopic study made of the material thus obtained. These cases were selected from extensive material. Those cases in which the clinical signs of early pregnancy had been positive are omitted, and those which were chosen had indefinite and misleading histories, in which a diagnosis could not certainly have been made without a microscopic examination. In these cases one cannot always decide between incomplete abortion, ectopic pregnancy, or metrorrhagia, often accompanied by retroflexion. Palpation gives indefinite results. On microscopic examination, in the first five cases, villi of the chorion could be recognized. These were often greatly degenerated but could be identified through their covering with ectoderm. These cells persist longer than others, and can be recognized by staining when only in the first stages of degeneration. The finding of ectoderm cells in the hyaline tissue of bloodvessel walls was also a useful point in diagnosis. These hyaline vessels are recognizable on repeated section through the tissue. Small masses of fibrin with the remains of endothelial cells, highly colored, and nuclein material, were often observed. The so-called glands of pregnancy from the decidua were not often seen, and but once in the series of cases studied. When found, they seemed normal, not much enlarged, with little secretion, highly stained, and the epithelia sharply defined. The struma of the uterine mucous membrane was but little altered.

These investigations led the writer to believe that the recognition of hyaline vessels with ectodermal cells, and the tissue removed from the uterus, is a most valuable sign of early and interrupted pregnancy, and is presumptive evidence from which a diagnosis can be made.

It is difficult to make a positive diagnosis of an early, but ended pregnancy, by the recognition of fetal tissue. In distinguishing between the changes which result as pregnancy and those following menstruation, one can best appreciate the difference in the greater vessels on the border of the mucous membrane and the muscular tissue; others have made similar observations, but most observers have mistaken the ectodermal for decidual cells. The large cells which are seen in the hyaline vessel walls at the site of the placenta are fetal cells.

THE DIAGNOSIS OF PREGNANCY OR THE PUERPERAL STATE, FROM THE PRESENCE OF SUGAR IN THE BLOOD. Benthin¹ has observed that as parturition passes into labor, and as expulsive pains develop, examination of the blood shows an increase in the quantity of sugar. This grows less in the puerperal state. The amount of this increase varies greatly in different cases, in some being so considerable as to constitute a distinct symptom.

The intense action of the muscles of the body during parturition

¹ Zeitschrift f. Geburtshülfe und Gynäkologie, 1911, Band lxxix, Heft 1.

may naturally be considered as a cause of this phenomenon. Curiously enough, the duration of parturition does not appear to be an essential factor in the production of sugar. The more active the labor and the stronger the uterine contractions the more sugar is present.

Cases of chronic nephritis with high tension in the vessels, when this complication affects pregnant women, have an increase in the blood sugar. On the other hand, similar cases which are not pregnant often have a diminished amount.

In the cases described by Benthin, blood pressure did not exceed 145 mm. He describes a patient who entered the hospital about a month before labor with the kidney of pregnancy. In the first months of gestation, the use of a very limited diet made the patient better. When admitted, $\frac{3}{4}$ of 1 per cent. of albumin was present in the urine, and 0.063 of 1 per cent. of blood sugar. Shortly before birth, after labor had been in progress more than half a day, and when the patient had passed through one eclamptic convulsion, the albumin was 12 per cent.; blood sugar, 0.097 of 1 per cent. Eleven days after confinement, $2\frac{1}{2}$ per cent. albumin and 0.074 of 1 per cent. sugar were found.

It would be a valuable study to determine the effect of weak labor pains upon the formation of sugar, and whether the quantity of sugar present has anything to do with the sluggish action of the uterus.

THE DIFFERENTIAL DIAGNOSIS OF PREGNANCY. Olshausen¹ describes some conditions which make the positive diagnosis of the later months of gestation difficult. He reports a patient married fourteen years, without previous conception. There had been amenorrhea for several months. The patient suffered from unfavorable sensations in the abdomen, with progressive increase in weight and in abdominal size. There was greater distention present than is usual at the end of gestation. An obscure result was obtained by palpation.

When the patient was given an anesthetic and examined, there could be detected in the abdomen three tumors, varying little in size, and egg-shaped. One was at the right pelvic brim, its lower end occupying the lesser pelvic cavity. One was found at the left at the pelvic brim, and seemed to be the uterus, four or five months advanced. The third tumor was entirely abdominal, interfering with respiration through pressure on the diaphragm.

A diagnosis of myomas, one subserous with pedicle, the other without, complicating pregnancy, was made. This was verified on section, and the tumors removed without the interruption of pregnancy.

Polyhydramnios often makes a positive diagnosis of pregnancy impossible or difficult. When the amniotic fluid increases in amount very quickly, it may be difficult to distinguish between this and ovarian cyst. The greater the distention of the uterus and the abdominal wall,

¹ Zeitschrift f. Geburtshülfe und Gynäkologie, 1911, Band lxxix, Heft 1.

the more difficult will be a positive diagnosis. In both, one may elicit fluctuation when it is usually impossible to palpate the child. Difficulty may also arise from flexion of the gravid womb. In multiparæ this may be confused with hypertrophy of the supravaginal cervix. It may be difficult to decide whether the case is one of uterine flexion or a tumor next the womb.

In studying these cases, it will be found of great value to pass the fingers along the border of the uterus from the vaginal portion of the cervix, as high as moderate pressure will permit. Even when no other complication is present, retroflexion of the pregnant uterus is a serious matter. Distressing symptoms in these patients may often be removed by correcting the dislocation.

The Urine in Pregnancy. The changes in the urine caused by pregnancy are described by Groat.¹ Disturbance in the nitrogenous metabolism of the body is universally found among pregnant patients. As this condition is peculiar to gestation, the fetus or placenta, or both, are direct or indirect causes. Whether the substances are toxins or ferments cannot definitely be decided. Ferments normally produced in the placenta may fail to recover or convert substances from the maternal blood which accumulate and are poisonous to the mother. The fact that patients usually improve rapidly when the uterus is empty is against the theory that these ferments convert various substances.

It seems possible that internal secretions from the fetus or placenta are necessary for the successful metabolism of pregnancy in the mother and ovum. These may overstimulate, charging the mother's blood with catalyzing bodies which are toxic. The changes in the thyroid gland and in the liver produce toxemia. These complications make it necessary that each pregnant woman should be watched, and the urine thoroughly examined, not only by the methods usually employed, but by nitrogenous partition.

Diagnosis of the toxemia of pregnancy cannot be based on albumin and casts only, but is made positive by the study of nitrogenous metabolism.

In testing for albumin, care must be taken to avoid the mucin-like bodies sometimes called "nucleo-albumin," which are precipitated by acetic acid in cold media. These substances are normally increased in pregnancy and whenever there is irritation in the urinary tract. Such can best be avoided by using Heller's test—cold nitric acid, carefully stratifying the urine on the acid. When serum albumin is present in pregnancy it may indicate that little or no toxemia is present, if the quantity is not large, and casts are absent, because this condition may result from increased blood pressure, kidney congestion, and overexertion. An acute nephritic process developing from an

¹ American Journal of Obstetrics, December, 1911.

old one, apparently cured, must be ascribed to the pregnancy which is present.

Direct changes in the kidney may result in toxemia.

In estimating the significance of sugar, it indicates that the pregnant patient has poor digestion of carbohydrates and that the condition is an alimentary glycosuria. True lactosuria may be detected by boiling the urine three or four minutes with a solution of sugar of lead, when a brown discoloration results, and by adding ammonia until the precipitate no longer dissolves, and a brick-red substance settles on standing, leaving a clear supernatant fluid.

Urea represents 87 per cent. of the nitrogenous metabolism during pregnancy; ammonia normally from 3 to 4 per cent.; creatinin, uric acid, and purin bodies, about 4 per cent., being 6 per cent. for rest nitrogen partly due to amino-acids. In pathological cases these proportions are greatly disturbed.

The writer describes a method which he has found accurate, which requires only the ordinary apparatus and reagents found in a good chemical laboratory: For estimating ammonia Mathison's method is employed; 20 c.c. of urine are measured and diluted with water until nearly colorless. To this is added a teaspoonful of crystallized potassium oxalate and a few drops of the saturated alcoholic solution of phenolphthalein. The whole is carefully neutralized with sodium hydroxide solution until a faint pink color appears; 5 c.c. of commercial formalin neutralized with sodium hydroxide to the same pink color, is prepared; $\frac{1}{10}$ normal solution of sodium hydroxide is then run in slowly until the pink color reappears. The number of cubic centimeters of sodium hydroxide used, when multiplied by 0.0014, gives the grams of nitrogen in the form of ammonia in 20 c.c. of urine; and multiplied by 50, the grams in 1000 c.c.

The method of total nitrogen is modified from that of Kjeldahl, by which the quantity of nitrogen in 1000 c.c. of urine is ascertained.

The Association of the Toxemia of Pregnancy with Hemorrhage. In the *British Medical Journal*, June 17, 1911, Davies-Coley reports 9 cases of hemorrhage occurring during labor in toxemic patients. He also reports 3 cases of purpura and hemorrhage from the mucous membranes in toxemic cases. His material embraced the cases treated at Guy's Hospital during the last eleven years, including 36 cases of eclampsia. In these, hematuria was present in 10, and of these patients 6 died, or 60 per cent.; while of the 36 cases, 11 died, or 30.5 per cent.

During the years from 1900 to 1910, 13 cases of concealed accidental hemorrhage were treated, of which 8, or 61.5 per cent., suffered from the toxemia of pregnancy. In 30 cases, external accidental hemorrhage occurred, but one showing signs of toxemia. This striking difference may be explained by the fact that in many cases the external hemorrhage was caused by low implantation of the placenta, although

the placenta could not be felt by the hand in the early stages of labor. Among these patients the signs of toxemia were albuminuria of toxic origin and not the result of nephritis edema; in one patient eclamptic convulsions occurred, and they possibly produced hemorrhage. Where there was a suspicion of chronic nephritis, the retinae were examined, but found normal.

But one case in which eclampsia had been present showed a tendency to postpartum hemorrhage, and in this the bleeding was not severe. Where there had been hemorrhage from concealed accidental placental separation, there was also no tendency to postpartum bleeding.

Three cases of extravasation of blood into the viscera and under the serous membranes are reported; 6 were between the ages of twenty and thirty years; 2 were primiparae, 1 pregnant the second time; 2 died, the third recovering only after being comatose for four days. The symptoms were acute toxemia; persistent vomiting with coma coming on more or less suddenly, were the predominant phenomena. In 1 patient coma was preceded by eclampsia; in 1, large quantities of serum albumin were present in the urine ten days before labor; in 2 cases the hemorrhage began before eclampsia developed; while in 1 it was not observed until after the fluids had started.

In all 3 cases the bleeding came from the stomach and intestines; in 2 cases bleeding from the gums was present. In all, there was profound anemia, while in 1 case the hemorrhage was undoubtedly the chief cause of death. There was no abnormal uterine hemorrhage in any case. In 1 patient there was moderate jaundice during convalescence.

The autopsy findings were those usually seen in eclampsia with a very marked degree of hemorrhagic extravasation in the liver, and the liver cells were more degenerated than those of the kidney. The mucous membranes of the stomach and intestines were deeply congested, and these organs were found with fluid blood. The symptoms indicated that changes in the liver were the primary condition, as the extravasation of blood was extensive in this organ, and the cells showed advanced stages of degeneration. In one patient, bleeding from the gums was present. This case proceeded to a fatal issue.

At autopsy, the mouth, stomach, and intestines were full of blood, and the mucous membrane showed large passages of ecchymosis. The liver was yellow, and showed large areas of extravasated blood. The children were lost in all 3 cases. The fatal symptoms were the hemorrhage, more or less profuse externally, the purpuric rash, irregular in outline, and the vomiting or passing of blood from the gastro-intestinal tract.

The Experimental Study of the Anaphylactic Theory of the Toxemia of Pregnancy. Johnstone¹ has made an experimental study to determine

¹ Journal of Obstetrics and Gynecology of the British Empire, February, 1911.

the part played by the placenta in producing anaphylaxis. He divides his experiments into five groups:

In the first he used the extract of placenta from an eclamptic patient obtained within an hour of birth, minced, washed as free from blood as possible, rubbed up with silver sand, and filtered through a sterilized filter. Two female rabbits received intravenously doses of 3 and $3\frac{1}{2}$ c.c. respectively. Eleven days later they had intravenous injections of 1 and 3 c.c. respectively, of the same juice, kept in the interval at a temperature just above the freezing point. Beyond a slight dyspnea and uneasiness, which passed off in a few minutes, no symptoms were observed on the second injection. In the second group, similar experiments were performed on 12 female rabbits, with the juice of normal human healthy placenta. This was extracted by hydraulic pressure. The doses varied from 3 to 5 c.c., in most cases being 4 c.c. The interval between the first and second doses varied from twelve to twenty-three days. The usual incubation period in the rabbit is about ten days, but it was thought possible that placental proteins might act differently. If the sub-sensitive state is established in the rabbit, it has been shown to persist at least ten days.

In seven of these animals slight symptoms were observed—dyspnea, blanching of the ears, loss of muscular tone, and slight fall of temperature. In the eighth case more marked symptoms followed the second injection—slight convulsions and profuse liquid diarrhea.

In the third group, the pregnant animals were injected with placental juice from another of the same species. Two rabbits and one guinea-pig were used, the placenta in each case being removed from a newly killed animal, minced, washed free of blood, and the juice extracted by rubbing up with sand, and filtering. In the guinea-pig there were no symptoms after the second injection. One rabbit showed only slight dyspnea, the other had no symptoms, but gave birth to three young in the interval between the first and second doses. These were stillborn but showed no obvious morbid appearances.

In the next two groups of observations, powdered placenta, suspended in normal salt solution was employed. As eclamptic placenta could not be obtained, normal ones were used. One gram of placenta powder, obtained by mincing, washing, drying to the consistence of soft sugar, pinkish brown in color, was suspended in 6 c.c. normal salt solution, and injected into the peritoneal cavity. Owing to the cellular nature of the mixture intravenously an injection could not be used, and so pronounced an effect could not be expected.

Of four rabbits thus injected with human placental powder, two died within twenty-four hours, postmortem showing congestion of the liver and kidneys and some recent peritonitis. The other two survived without disturbance, and received second doses, eleven and twelve days afterward. There was not the slightest appearance of

anaphylactic symptoms during the twelve hours subsequent to the second injections.

In the fifth group a similar experiment was carried out on a female rabbit, with powder of rabbits' placenta, and with the production of only very slight panting and uneasiness, which might have been caused by the injection of a gram of solid matter into the peritoneal cavity.

When these experiments are summarized, it is found that anaphylactic symptoms were obtained by the use of normal human placental juice in 8 out of 12 rabbits. This indicates that the human placenta contains some complex protein body acting as a toxin for other animals. No results followed the use of eclamptic placental juice, which may mean that the toxic element had passed out of the placenta into the patient's body. No results followed the use of extracts of animals of the same species. The powdered placenta was inert in both human and other animals.

In reviewing these experiments, Johnstone believes that the positive results were caused by placental elements and not by blood serum or products of autolysis. Different placenta gave substances very much differing in potency. These experiments show, in the light of our present knowledge, that there is no evidence of anything of the nature of anaphylaxis in the usual manifestations in the toxemia of pregnancy.

The Treatment of the Toxicoses of Pregnancy by Serum from Normal Pregnant Patients. Meyer¹ reports the case of a primipara, aged twenty-three years, who in the tenth month, after a previously normal pregnancy, suffered from acroparesthesia. She complained of itching, deafness, and peculiar twitching sensations in the tips of the fingers. The symptoms resembled some of those seen in acromegaly. Examination of the urine was negative. It was thought that some lesion of the hypophysis was present. Intravenous injections of 10 c.c. of serum from a normal pregnant patient were given. Two days after this treatment the itching completely disappeared, the other symptoms grew better and soon ceased.

A second case was that of a multipara in the middle of the tenth month of pregnancy, who was seized with vomiting and the development of herpes. The symptoms were not influenced by labor, and persisted in the puerperal state, the whole body being covered with the eruption on the third puerperal day. Twenty c.c. of serum from a normal pregnant patient was injected into the muscles. The eruption covered the body so completely that no suitable point for puncture of a vein could be found. The patient improved considerably, and three days after the injection a second one of 35 c.c. was given. This was followed by marked improvement. On the tenth puerperal day 20 c.c. were given, followed by the speedy collapse and disappearance of the vesicles then present. The temperature curve was irregular, but

¹ Zentralblatt f. Gynäkologie, 1911, No. 37.

ceased to rise especially high after the second day following the second injection.

His third case was that of a multipara, aged twenty-three years, between the sixth and seventh months of pregnancy, who was taken with severe eclampsia. On admission the patient was in deep coma without corneal reflex, the pulse, 96; blood pressure, 175; temperature normal, no edema; 80 c.c. of urine obtained, with 7 per cent. albumin, casts, and epithelia from the kidney. Fetal heart sounds could not be heard; the uterine contractions were occurring every five minutes; there was colostrum in the left breast, which on examination showed milk corpuscles of differing size. The rupture of the membranes was followed by no improvement. Twenty c.c. of serum from a normal puerperal patient were injected, and in fifteen minutes the comatose patient became restless and apparently felt pain. The patient gradually grew more conscious, but after severe convulsions again became comatose. Another injection of 20 c.c. were administered, a few drops of chloroform being given to prevent irritation during the injection. The same effect followed, namely, the patient became restless, less comatose, and seemed to feel pain. A few hours later, under a few drops of chloroform, a foot of the fetus was seized and brought down. The temperature rose somewhat, the blood pressure fell 10 mm., and the patient became better and more nearly conscious. The secretion of urine increased considerably, and a third injection of 20 c.c. was administered. Some hours after, the patient gave spontaneous birth to child and placenta without hemorrhage. The child had but recently died. The patient made a gradual recovery, complicated by thrombosis of the femoral vein.

Changes in the Sudoriparous Glands Occasioned by the Toxemia of Pregnancy. Fossati reports from Mangiagalli's clinic in Milan, 21 cases of the toxemia of pregnancy in which a study was made of the sudoriparous glands.

The article is accompanied by a number of excellent illustrations showing the microscopic appearances. These sections show proliferation of epithelia, hemorrhages into the substance of the gland, and masses of hematin diffused throughout the acini of the glands.

The Liver of Pregnancy. Hofbauer¹ calls attention to changes in the histology and functions of the liver occurring during pregnancy. He has found infiltration fat in the central portions of the acini with diminished formation of glycogen; accumulation of bile with a deposit of pigment, and dilatation of the biliary capillaries; dilatation and practical engorgement of the central veins and capillaries leading to them.

To estimate the metabolic power of the liver for the digestion of carbohydrates, he draws attention to the experimental administration

¹ Archiv f. Gynäkologie, 1911, Band xciii, Heft 2.

of levulose. Schröder believed that in one-fifth of all cases an alimentary levulosuria was present in pregnancy. In more recent studies Reifenstein found this present in 86; Falk and Hesky in more than 80 per cent.

We know that the liver determines the quantity of sugar in the blood and converts its glycogen into sugar. If 100 grams of levulose be given by the mouth, sugar is found in the urine.

Experimental study of the function of the liver in nitrogenous metabolism has also been made in recent years. While normal human beings dispose of the amino-acids, those suffering from degenerative processes in the liver excrete them unaltered in the urine. Van Leerson, in studying pregnant patients, found two or three times the normal quantity of amino-acids in 40 per cent. of his cases. When these substances were administered by the mouth, pregnant patients tolerated them badly. Rebudi repeated this observation. In normal pregnant patients there is an increase of the oxyprotein acids in the urine. The recent work of von Fritz, Falk, and Hesky, show that the pregnant patient has from three to six times the usual quantity of amino-peptid material in the urine compared with the normal patient. In the last third of pregnancy this increase is remarkable. In three-fourths of all cases there is a great change in the normal nitrogenous metabolism during pregnancy. Where the ammonia nitrogen in normal patients is from 3 to 5 per cent., in pregnancy it is considerably increased through failure in the functions of the liver.

Glyoxyl acid is also found in an increased quantity in the urine of pregnancy as a by-product of the action of the liver on glyccoll. Fossati has shown that the fat digestive function of the liver is much diminished in pregnant animals.

Attention is called to the value of physiological and chemical experiments in studying the metabolism of pregnancy.

Serum from Normal Pregnant Animals as a Remedy for the Toxicoses of Gestation. Rübsamen¹ reports the case of a multigravida, aged thirty-two years, who had had five pregnancies, in each of which she suffered from exanthem on the right arm, which disappeared after labor. She had come to rely upon this as a diagnostic sign of pregnancy.

When the patient came under observation she was between the sixth and seventh month, in wretched general condition, and with slight icterus. There was pain on pressure over the region of the gall-bladder and the right kidney. The urine contained $\frac{1}{2}$ of 1 per cent. albumin, urobilin, biliary coloring matter, leukocytes, granular casts, epithelia from the pelvis of the kidney, and the *Bacillus coli communis*.

Cystoscopy showed the mucous membrane of the bladder intact, but reddened about the opening of the left ureter. On the right forearm, three fingers' breadth below the elbow there was an eruption,

¹ Zentralblatt f. Gynäkologie, 1911, No. 21.

which did not itch, containing points of hemorrhage, producing a sub-icteric color on the skin. These lesions did not pale on pressure. The skin over the remainder of the body was normal, the pulse, 130; the hemoglobin was $\frac{5}{10}$; the Wassermann reaction, negative.

The diagnosis of right-sided pyelonephritis from infection by the *Bacillus coli communis* was made. The exanthem on the arm was hemorrhagic.

The patient was treated by a milk diet and salol, with considerable improvement for three weeks. The fever disappeared and the pulse was slower and better. After the patient had been without treatment for eight days, and as but a trace of albumin remained in the urine, it was determined to try the injection of blood serum.

A healthy primigravida, in the ninth month of pregnancy, aged twenty years, having a negative Wassermann reaction, was selected, and by experiment it was found that her blood serum was not hemolytic. Fifteen c.c. of this was injected into the left median vein. This injection was well borne, and was followed in five days by serum urticaria, especially well marked on the skin of the abdomen. There was no rise of temperature. No change could be observed in the exanthem, and the patient thought that the injection made her feel worse. The amount of albumin in the urine increased to 2 per cent.

Anaphylaxis between Mother and Child during Pregnancy. Graefenberg,¹ in a paper read before the Obstetrical Society, at Berlin, reported experiments upon guinea-pigs to determine the existence of anaphylaxis between the pregnant animal and her young. He has found that the increased toxicity of fetal serum for pregnant animals leads to the conclusion that the pregnant animal is physiologically suprasensitive to bodies contained in fetal serum. Animals which are not pregnant develop this suprasensitiveness when fetal serum is injected, and perish by the repeated injection, with the same symptoms shown by those animals destroyed by the first injection. The manifestations are those of anaphylactic shock, and the appearances found at post-mortem are those of fatal anaphylaxis. By this term we understand suprasensitiveness of the animal bodies artificially produced in the parental body. The albuminoid bodies, antigens, may be conveyed by subcutaneous intraperitoneal or intravenous injections. Usually from ten to fourteen days must elapse after the first injection to produce this increased sensibility. When blood serum of a sensitive animal is injected into the abdominal cavity of a normal guinea-pig this animal becomes at once suprasensitive to the injection of albuminoid bodies. The second animal is said to be passively anaphylactic in relation to the first. Anaphylaxis is practically an antibody reaction and a species of immunity reaction. In pregnancy, the material from the fetus entering into the maternal circulation causes the maternal organism

¹ Zeitschrift f. Geburtshülfe und Gynäkologie, 1911, Band lxxix, Heft 1.

to be suprasensitive to fetal products. By experiment, it was found that quantities of albuminoid substances borne without disturbance by normal animals produced convulsions and death in those who were pregnant. An injection of this substance into the maternal blood often produced abortion in pregnant animals.

His experiments show that the toxicity of the serum of pregnant individuals is not increased above normal, but is less than normal as soon as labor has occurred. In the puerperal period the antigen rest bodies combining with the maternal antibodies produce anaphylaxis, which is that of antiserum. This would indicate that during pregnancy the maternal blood is normally toxic, but that after labor the toxicity of maternal serum is greatly diminished.

Tuberculosis Complicating Pregnancy. An unusual number of papers upon this interesting subject shows the attention which it is receiving from the profession. Schauta¹ believes that the important questions to determine regarding tuberculosis of pregnancy are: (1) Does tuberculosis increase more rapidly during pregnancy than in the non-pregnant patient? (2) Can we by dietetic and hygienic treatment prevent the increase of tuberculosis during pregnancy? (3) Is the interruption of pregnancy indicated with tuberculous patients?

Regarding the first, Schauta calls attention to the fact that one must not be deceived by pregnant patients badly nourished, with pulmonary catarrh and apparently suffering from tuberculosis. To be accurate, one must make a positive diagnosis of tubercular infection of the lungs or larynx. Heimann found that during pregnancy in tuberculous patients 73.4 per cent. grew markedly worse. The mortality of tuberculosis complicating pregnancy is 45.9 per cent. In cases of old tubercular infection in a quiescent condition, pregnancy caused an increase of the disease in 68 per cent. according to the investigations of Fellner and Schauta. Pradella collected 1035 cases of pregnancy complicated by tuberculosis, in 95 per cent. of which the tubercular process was made more active by pregnancy; $1\frac{1}{4}$ per cent. died undelivered, but in the puerperal period the tubercular process increased in three-fifths of the cases. When the interruption of pregnancy was included in the methods of treatment, 83 per cent. showed some improvement. This increase in the tubercular process is naturally explained by the changes in the circulation produced by pregnancy, increased labor thrown upon the heart, compression of the lungs by inability to take a deep breath from the pressure of the growing uterus, diminution in the red blood corpuscles, loss of appetite, vomiting, and impaired nutrition. The rapid increase of tuberculosis after labor has been commonly observed. This, however, is limited to pregnancy at term, as after abortion the patient grows better. In tuberculosis of the larynx, pregnancy makes the condition worse, for in 75 per cent. of all healthy pregnant patients

¹ *Monatsschrift f. Geburtshülfe und Gynäkologie*, 1911, Band xxxiii, Heft 3.

the mucous membrane of the larynx is found somewhat reddened and swollen.

By experiment upon animals Hermann and Hartl found that in guinea-pigs pregnancy increased the tubercular process in 71.2 per cent. Few writers contend that pregnancy is a favorable complication of tuberculosis, and their conclusions are based upon a small number of observations.

As regards the question, What can be done for a pregnant tuberculous patient by general and hygienic treatment, we are met at once by the unfortunate fact that the great mass of tuberculous patients are poor, and often cannot have such treatment. Marriage should certainly be forbidden in weak and tuberculous young women. Even among the well-to-do but few cases of improvement in tuberculous pregnant patients have been observed.

Holbeck, in a private sanitarium for tuberculous patients in Norway, observed 19 in whom he thought improvement had taken place; 16 of these cases were traced after pregnancy had terminated, of whom 6 died within a year and a half.

Essen-Möller reports 50 per cent. mortality, or a great increase in the tubercular process among pregnant tuberculous patients. Among women living in the most favorable conditions for health, 29 per cent. became distinctly worse when pregnancy complicated tuberculosis. When pregnant tuberculous patients go to term, the children are born weak and miserable, and seldom survive the twentieth year. Those who urge against the performance of abortion in tuberculosis advise treatment by tuberculin and kaladin, and report 61 cases of tuberculous pregnant patients under the best possible surroundings, in whom tuberculin did not produce abortion, and seemed to exercise no unfavorable influence upon the pregnancy.

When the question of the *value of interrupting pregnancy in tuberculosis* is considered, one must clearly distinguish between the production of abortion and the interruption of pregnancy in the later months. In the latter, pregnancy is interrupted only in the interest of the child, as the mother will certainly become worse after delivery.

Pradella's statistics indicate that the interruption of pregnancy may be followed by recovery during the first stage of tuberculosis in 89 per cent.; during the second stage of tuberculosis in 83 per cent.; during the third stage in 25 per cent. A positive improvement followed the induction of abortion in 91 per cent. There is no reason to doubt that the production of abortion is indicated in tuberculous patients.

Kaminer would limit the favorable result following abortion to improvement and cessation in the tubercular process, lasting at least three years after pregnancy had ended. He has never seen complete recovery, but improvement. Among obstetricians, three groups have developed as regards the question under discussion. The French

do not deny the unfavorable influence of pregnancy in tuberculosis, but are not in favor of abortion, and would rely upon dietetic and hygienic treatment. The second group is comprised of those who decide according to the conditions of each individual case. In advanced tuberculosis, abortion is indicated; in stationary tuberculosis, general hygienic treatment should be employed. The third group comprised those who believe that a diagnosis of tuberculosis in a pregnant patient furnishes a valid indication for the production of abortion.

Thus, Pinard would decline absolutely the production of abortion, or premature labor in tuberculosis. Boklemann is of the same opinion. The majority of German authorities take the standpoint of the individual study of each case. Hammerschlag advises the interruption of pregnancy when tuberculosis is rapidly increasing in the first and second stages at the beginning of gestation. Rosthorn and Fraenkel advise the interruption of pregnancy in the beginning, in all patients who have fever, where tuberculosis is not advanced, and when complications in the heart, in the digestive or urinary tract, or the larynx are present, and when the patient's nutrition is greatly below the average. In cases of tuberculosis of the larynx, Rosthorn would not invariably interrupt pregnancy. He believes the prognosis is favorable without this where the disease has remained stationary for several years, when the nutrition is good, and fever and hemorrhage are absent, although bacilli may be present in the sputum.

Martin considers that a positive result in the ophthalmic test for tuberculosis in pregnant women is a favorable sign as indicating a considerable quantity of immunizing material in the blood of the patient. In these cases he would not interrupt pregnancy. When the reaction is negative and the clinical signs of tuberculosis are present, he would end the gestation. Unfortunately, the attempt to study each case individually is uncertain, in view of the fact that three-fourths of all cases grow worse during pregnancy, and but 50 per cent. of all tuberculous patients becoming pregnant do not long survive delivery.

The valid argument for prolonging pregnancy in tuberculous patients may be the desire to obtain a living child. While the production of abortion may often be indicated, one must remember that a tuberculous patient can endure spontaneous birth at the normal end of gestation far better than the interruption of pregnancy, and sometimes the hemorrhage of induced labor. If one waits to obtain a living child, one will often interfere too late in the interests of the mother.

Schmorl found in 45 per cent. of placenta from tuberculous mothers that the tubercular process had affected the placenta. In the early months of gestation the uterine decidua may be involved, while as pregnancy advances the fetal portion of the placenta becomes tuberculous.

Schauta is strongly of the opinion that the diagnosis of tuberculosis

in the pregnant patient is a valid indication for the production of abortion, in view of the increased morbidity of pregnant tuberculous women and the uncertainty of delay in the interests of mother and child. Treatment in a sanatorium for tuberculous pregnant patients is of doubtful value and cannot be obtained in many cases. The interruption of pregnancy in the second half does no good, but frequently harm, and in some cases may be produced at the expense of the mother, with the hope of saving the child.

As regards the *technique of abortion in tuberculous patients*, Fritsch gradually dilates the uterus with laminary tents and gauze packing. Unfortunately this method is sometimes followed by purulent catarrh of the Fallopian tubes, and sometimes by ascending tubercular infection. For this reason some urge vaginal Cesarean section; others advise the sterilization of the patient, if possible, by vaginal incision and the removal by ligation of the tubes.

Martin and others urge the total extirpation of the uterus and tubes with no disturbance of the ovaries. Martin believes in extirpation because tuberculous women easily conceive, and each conception is an added danger, and because the removal of the uterus and tubes is often followed by increase in weight. Some deny that this is a gain for tuberculous patients, as the increase in weight throws a heavier work upon the lungs to maintain the patient's oxygenation.

In comparison to this somewhat more serious operation, the interruption of pregnancy may be accompanied by the ligation of the Fallopian tubes. This is accomplished by an incision through the anterior wall of the vagina, the cervix, and the uterine segments. The tube is grasped near the round ligament at its uterine extremity, ligated and divided, and the uterine stump covered by the tissues of the round ligament. The lateral stump requires no cover. If desired, sterilization may be made temporarily, and should the tubercular process completely heal, the resected tube or ovary may be implanted in the uterine wall.

Sellheim's method of temporary sterilization by bringing the fimbriated extremity of the tube outside the peritoneum may also be employed. Bucura would perform the extraperitoneal implantation of the ovaries.

Henius¹ reviews the recent literature of the subject, and adds his own conclusions from observations in the second medical clinic at Berlin.

He believes that in seeking indications for the interruption of pregnancy, because of tuberculosis, one should thoroughly study the condition of the various organs. If infection of the lungs is present, it is in the first, second or the third stage. If this process is complicated by tuberculosis of other organs, or if the tubercular infection is limited to

¹ Monatsschrift f. Geburtshülfe und Gynäkologie, 1911, Band xxxiii, Heft 3.

one organ or set of organs, the general condition of the patient as regards weight, temperature, etc., must also be considered, as well as the individual reaction of the patient to treatment, and those general circumstances upon which one must often base a decision. The mistake must not be made of looking only to anatomical processes, or passing one's opinion upon a biological reaction only. Should pregnancy be interrupted, this should preferably be done not later than the fourth month, as after this the disturbance and injury to the patient is fully as great as that of labor at full term. The contraindications are the pregnancy already surpassing the fourth month.

In cases of tuberculosis of the lungs in the first stage, when the general condition grows worse and the history of the patient is unfavorable, and the sanitary condition undesirable, pregnancy must be interrupted. In the second and third stages this is urged in every case where the patient has not shown a strong tendency to resist the infection and to improve. Pregnancy should also be interrupted in tuberculosis of the larynx, either alone or complicated by infection of the apices of the lungs. In tuberculosis of the peritoneum, which has commenced to attack the intestine, and in tubercular infection of the urogenital apparatus, pregnancy before the fourth month should be brought to an end.

In estimating the importance of tubercular infection other than the lungs, the same lines of reasoning apply which have been described as regards pulmonary disease. Pernicious nausea, the toxemia of pregnancy, and heart lesions complicating tubercular infection in pregnancy, from a valid indication for its interruption.

As regards the surgical treatment best adapted to preventing conception, castration is not considered favorably, for the accumulation of fat which follows this operation does not indicate a real gain in strength, but the fact that the removal of ovarian secretion has disturbed the natural metabolism of the body. When tuberculous patients gain in weight without castration it indicates an improvement in nutrition.

Prochownick¹ states that from 1877 to 1900 he practised the *interruption of pregnancy for tuberculosis*, performing the operation in the early months. He gives a tabulated statement of his cases—30 in number—with the ultimate results so far as they could be obtained. Since 1900 he has treated 30 cases without the interruption of gestation. His conclusions are that sterilization of the patient with the best hygienic treatment for three months afterward, offers the best chance for prolonging the life of the individual.

Schlimpert² gives the results of his observations in 3514 autopsies, as regards the occurrence of tuberculosis in women, especially during

¹ Monatsschrift f. Geburtshilfe und Gynäkologie, 1911, Band xxxiii, Heft 3.

² Archiv f. Gynäkologie, 1911, Band xciv, Heft 3.

the condition of pregnancy. These observations have extended over ten years.

In 29 per cent. of the 3514 female bodies examined, tuberculosis was found in one or more organs; in 61.8 per cent., tubercular changes that could be detected without microscopic examination had evidently caused the patient's death. This made a mortality of almost 50 per cent. of deaths from all causes. In 30.9 per cent. the tubercular process had become quiescent, and in 16.8 per cent. it was in the first, or beginning stage; in 5.3 per cent. the tubercular process was in what could be termed the middle stage; 2.3 per cent. could be described as acute miliary tuberculosis.

If one classifies the cases as to the occurrence of the small nodules in the various organs where the tubercle bacilli must have entered the blood current during life, the percentage was 22.6 per cent. Tuberculosis was found most often in these cases in the liver, next in one or both kidneys, and then in the spleen.

As regards the age of the patients, 18.7 per cent. were between twenty-one and thirty years, 15.1 per cent. between thirty-one and forty, 13.9 per cent. between sixty-one and seventy years. From infancy to ten years of age there were 9.9 per cent. The mortality rate was thus highest between twenty-one and thirty years, then dropping to forty-one and fifty, where it remained practically stationary until it fell again between sixty-one years and the termination of life.

It is interesting to observe that nearly one-half of all cases coming to section perish of tuberculosis between the ages of twenty-one and thirty years. Older people seem to resist the process, for its mortality in the years after fifty is less comparatively than that of other causes. It is also observed that the longer life endures the better is the chance for the patient's power of resistance to overcome the infection.

When these cases are studied from the standpoint of the various organs, it is found that 84.3 per cent. have pulmonary tuberculosis. Next in frequency is intestinal tuberculosis, 32.3 per cent., with peritoneal tuberculosis, 4.9 per cent. Genital tuberculosis and meningeal infection have much the same frequency, the first 3.4 per cent.; the second, 3.3 per cent. So, also, tuberculosis of the bones has 2.5 per cent., and tubercular infection of the pericardium, 2.2 per cent., while infection of the urogenital system was found in 1.4 per cent. Most of the fatal cases were pulmonary, next meningeal, and next tuberculosis of the intestine. Miliary tuberculosis had been fatal in 49 patients.

When tuberculosis of the peritoneum is considered, it is found to stand midway between the most frequent and the least common variety. Like other forms it was most often found between the ages of twenty-one and thirty years, and arose through direct contagion from tuberculous ulcers of the intestine or from the passage of the tubercle bacilli

by means of the lymphatics, without rupture of the intestinal wall. There was no evidence that tubercular infection could travel through the lymphatics of the peritoneum to other serous membranes—as the pleura and pericardium. This process, could, however, infect the blood stream and thus carry infection to other organs. Peritoneal tuberculosis was frequently found in combination with other forms, usually developing through small foci in the liver, spleen, or kidneys, which had infected the blood. Peritoneal tuberculosis without involvement of other organs was not found.

The mortality of this variety was by no means high, being estimated at 8.3 per cent. It is a usual accompaniment of severe infection of other organs. Thus 88 per cent. of cases having peritoneal tuberculosis perished from tubercular infection of other and vital organs.

In considering the question of tubercular infection of the genital organs, Simmonds, in 6000 autopsies on female bodies in Hamburg, found it present in 1.3 per cent. Schramm, in 3386 bodies, in 1 per cent.; Schlimpert found it present in 1.2 per cent., and like other varieties, most frequent between the twenty-first and thirtieth years. After the thirtieth year its frequency lessens.

Considering the combination of tuberculosis in the genital organs, with infection of other organs, it was found in 11 per cent. that tuberculosis was present in both the genital, urinary, and digestive systems. In 5 per cent. pregnancy or the puerperal period had been present, and infection had developed in the genital tract. Tuberculosis of the vagina was found in 9.6 per cent. of all cases; of the uterus alone 15.1 per cent.; of one or both tubes alone 28.8 per cent.; in one or both ovaries alone 2.7 per cent. The most frequent combination of organs in tuberculosis of the genital tract was the uterus and both Fallopian tubes—in 38.4 per cent.

The infection can be explained by the direct importation of the tubercle bacilli in the external genitals or vagina. No case of primary, isolated general tuberculosis could be discovered. In 2 cases there seemed to be direct indications of this infection of the genital organs from the tuberculous intestine, and in 1 case from the tuberculous bladder. That the genital organs can become infected through the blood current was shown by a number of cases which could be explained in no other way. In 5 cases the contamination could be demonstrated. In fact, this mode of infection is probably the most frequent, and the Fallopian tube the organ most often infected. The placenta also may be the source of infection in the genital tract of the mother. In 2 cases this connection could be positively demonstrated; in 4 it seemed most probable. Schlimpert could not find a definite connection between genital and peritoneal tuberculosis.

Vaginal tuberculosis took the form of an isolated tubercular infection; while tuberculosis of the cervix was found in cases of severe general

infection, often combined with infection of other genital organs. In 1 case a relation could be traced to labor and the puerperal period; in 2 others to peritoneal infection. In the uterus tubal infection seemed most often present, while the womb itself seemed to have become diseased through the blood current. In 11 cases of isolated uterine tuberculosis, 2 had first developed the disease at the site of the placenta. Tubal infection is most common, arises primarily from the blood stream, and most often takes the form of tubercular pyosalpinx. Ovarian tubercular infection is rare, occasionally appearing in miliary tuberculosis; in 3 cases in tuberculosis of the serous membrane; in 1 of which the uterus was involved.

We do not know whether the ovary becomes infected through the blood stream or the lymphatics; though the parametrium rarely becomes involved, but usually in severe cases where the uterus, tubes, or ovaries have become diseased.

The prognosis of genital tuberculosis, as regards life, is good, for in no case was the tubercular process in the genital tract the direct cause of death. In no case did genital tuberculosis invade the blood stream directly, and in but 2 cases was it possibly the indirect cause of death. It is very doubtful whether even in connection with peritoneal tuberculosis it brings about a fatal issue. Tuberculosis of the genital organs is comparatively rare, often ascending from the urethra and bladder, and never found as an isolated process. In most cases the infection is through the blood current and proceeds from above downward. It is usually found with general tuberculosis, and may show ascending infection from the bladder to the kidney.

As regards tuberculosis complicating pregnancy or the puerperal period, it was found in 273 cases, or 7.8 per cent.; in the first half of pregnancy, in 9.5 per cent.; in the second half of pregnancy, in 5.9 per cent.; in the puerperal period after abortion in the first half of pregnancy, in 9.9 per cent.; after premature labor, in 6.2 per cent.; and in the puerperal period after full term labor, in 68.5 per cent.

The fatalities of tuberculosis in parturient women may be estimated from the fact that in these autopsies 36.7 per cent. of pregnant patients had a fatal form of tuberculosis; 21.6 per cent., a beginning form; 2.9 per cent. a middle form, while 38.8 per cent. had overcome a tubercular process during some period of life. Among the necessarily fatal cases the great majority were pulmonary, then miliary, cerebral, and meningeal. In the middle form the frequency was equally divided between the lungs, the intestine, the bones, and the larynx. Beginning tuberculosis in parturient women showed itself about equally in the lungs and lymphatic glands. Healed tuberculosis showed itself most often in the lymphatic glands, then in the lungs, then in the two in combination.

To show the frequency of tuberculosis in pregnant women, one-

half of all parturient patients whose bodies were examined showed tuberculous lesions in some form. This disease is more common during the child-bearing period.

When one studies the period of gestation at which tuberculosis is most fatal, one finds the mortality increasing from the puerperal period following abortion to that of premature labor, and then to labor at full term. After abortion, more deaths in tuberculous patients take place from septic infection than from tubercular processes, while tubercular mortality is highest after induced labor. In very severe tuberculosis premature labor may develop, while the disease is often most stimulated by labor at full term.

These statistics show, curiously enough, that the mortality of tuberculosis in the puerperal period is less than the general mortality of tuberculosis among women during the child-bearing age. This would indicate that tuberculosis does not grow essentially worse in the puerperal period. Thus, sepsis, eclampsia, and hemorrhage, cause 61.9 per cent. of puerperal deaths. By comparison, the mortality of tuberculosis alone in this period is but one-third as much. When, however, one surveys the general mortality of tuberculosis one finds that at certain periods in the life of women this disease is most fatal, and one of these periods is the puerperal. Not more than 10 per cent. of all cases coming to section die of septic infection, but when the puerperal patients are considered, the mortality is five times as great at all periods of gestation, and at full term six times as great.

All things considered, tuberculosis must be regarded as a most dangerous complication of pregnancy and the puerperal state.

An interesting discussion upon this subject from the Obstetrical Society at Berlin, by Bröse, Schaeffer, and others, is found in *Zentralblatt f. Gynäkologie*, 1911, No. 43, p. 1512. Differing views are expressed, and Martin reported 27 cases with pregnancy complicated by tuberculosis which he had been able to examine six months after delivery. In this discussion the mortality of tuberculous patients treated by therapeutic abortion had been 45.5 per cent.; by extirpation of the uterus, 5.6 per cent.; and by amputation of the fundus, *nil*.

To determine the influence of pregnancy upon tuberculosis and the relationship existing between them, Cristofolletti and Thaler¹ conducted experiments upon guinea-pigs. They found that the substances in the human blood serum which attack the fatty tissue vary but little in different conditions of the body, and that no difference was observed between the serum of pregnant and non-pregnant individuals. The alterations in fat metabolism seen during pregnancy have a direct influence upon the vitality of the tubercle bacillus, and are undoubtedly a factor in the increased activity of this infection during

¹ Monatsschrift f. Geburtshülfe und Gynäkologie, 1911, Band xxxiv, Heft 5.

pregnancy. This, and other factors, are most potent during the second half of gestation.

As regards the best method of interrupting pregnancy in tuberculous patients, and at the same time securing sterilization, the writers believe that resection of the Fallopian tubes at the isthmus is of advantage, because of its certainty and practical application. This operation can be best and most advantageously done during the first three months of pregnancy. It was observed that guinea-pigs that had been castrated showed a lessened resistance to the tubercular process, although an essential difference could not be demonstrated.

Bardeleben¹ reports 54 cases of tuberculosis complicating pregnancy, 50 of which he has had under observation continuously for a period of four and a half years. He divides his cases into 30, in which operation was performed between the first and third months, with a mortality of 3.3 per cent.; 8 cases in which operation was performed between the fourth and seventh months, with a mortality of 25 per cent. All of these patients had tubercular infection of the apices.

In the second group were 12 cases with active tuberculosis throughout the lungs, with infiltration, exudate, fever, and tubercle bacilli in the sputum; 11 of these were operated upon before the fourth month, and 1 between the sixth and seventh month, with a mortality of 58.3 per cent.; in 10 cases the patients grew rapidly worse during the puerperal period; in 29 cases, 10 had suspension of the advancing infection, while in 19 cases its progress ceased entirely.

In comparing total extirpation of the uterus with amputation of the fundus, his results were better with the former than with the latter.

The purpose of the operation for excision of the fundus is to remove the greater portion of the uterus, and especially the site of the placenta, which may be the focus of tubercular infection. The tubes and ovaries may be removed, or the tubes only, and the ovaries left, according to the judgment of the operator. Before the fourth month the operation may be done through the vagina, the uterus being incised, the ovum removed, and the decidua vera removed so far as possible by thorough wiping with gauze. The stumps of the adnexa are left outside the peritoneum. If the operation is performed through the abdominal wall after the fifth month, the method is essentially the same, and the results equally good. The operation does not require much time, and the blood loss is less than by therapeutic abortion.

The paper is illustrated by excellent drawings.

THE SENSIBILITY OF PREGNANT AND PARTURIENT PATIENTS TO TUBERCULIN. Bar and Devraigne² have made experiments with tuberculin to determine the sensibility of pregnant and puerperal patients to this substance. They conclude that in a pregnant patient in apparent

¹ Zentralblatt f. Gynäkologie, 1911, No. 30.

² L'Obstetrique, 1911, No. 4.

good health, and with no symptoms of tuberculosis, there is observed at the ninth month of pregnancy a perceptible lessening in the reaction of the patient to tuberculin, whether the solution employed be 1 to 10,000 or 1 to 5000. In pregnant patients in good condition, the tuberculin reaction is even less than that in normal individuals. When the entire period of gestation is considered, the reaction is exceedingly variable. A high average would be 24 cases in 100. In healthy puerperal women there is a diminution in the sensibility of the patient to tuberculin, the lowest point being observed from the fourth to the tenth day. This diminished sensibility disappears after the tenth day.

In pregnant patients who are tuberculous and in whom the lesions are not of an aggravated form, the proportion of positive and well-marked reactions to tuberculin is increased up to the end of gestation. In the puerperal period, there is diminished sensibility during the days immediately following the birth of the child.

In summing up their experiments and observations, the writers conclude in general that pregnant patients show a lessened reaction to tuberculin. This does not exist over a long period, nor to a well-marked extent, but it is distinctly demonstrable in the last month of pregnancy. In puerperal patients the reaction diminishes from the fourth to the tenth day, and during the entire puerperal period seems to be less than that of pregnancy. Apparently there is a lessening in the power of the antibodies during the last months of pregnancy which is especially well marked immediately after parturition.

THE TREATMENT OF PREGNANT TUBERCULOUS PATIENTS BY THE TOTAL EXTIRPATION OF THE UTERUS AND ADNEXA. During the recent meeting of the German Society of Gynecologists, Martin¹ observed in Bumm's clinic 26 cases of total extirpation of the pregnant uterus and adnexa in tuberculous patients. Those who were not benefited by the operation did not survive a year after its performance. There were 6 of these patients.

In 16 cases the patients were brought to the hospital in a critical condition, but after the operation recovered sufficiently to go to their homes and resume in some degree their usual mode of life. The tubercular lesions subsided somewhat and were reduced to a minimum.

Martin reasons that in every case of tuberculosis the patient is always better when there is an increase in weight through the deposit of fat. He argues that the removal of the genital organs during pregnancy is followed by this increase in weight, and is well borne; while the puerperal period is noted as an unfavorable time for the development of tuberculosis. The fact that the blood loss of menstruation is made impossible by the removal of the pelvic organs is an indication of value.

¹ Zentralblatt f. Gynäkologie, 1911, No. 29.

In selecting cases, one must avoid those so far advanced in tubercular disease that improvement cannot be expected, and also cases of tuberculosis of the larynx.

Rissmann has operated upon 15 cases, most of whom have survived the operation five years, and the most recent three years; 9 of these had no tubercular lesions which could be detected, except tubercular infection of the genital organs or peritoneum. The value of abdominal section in peritoneal tuberculosis seems definitely established; 8 cases were operated upon who had fever, among whom 6 were discharged from the hospital without fever. The other 2 had tubercular infection of the intestine, and severe infection of the lungs. Such cases are unfavorable for operation. Where tuberculosis is encapsulated in the peritoneum, operation is clearly indicated. In tuberculosis of the bladder with tuberculous kidney, after nephrectomy, good results are observed by injecting $1\frac{1}{2}$ per cent. of iodoform vasogen in combination with tuberculin. In operating upon peritoneal tuberculosis, $1\frac{1}{2}$ grams of sterile iodoform may be sprinkled upon the abdominal tissues and in the wound to advantage.

Fetzer reported 24 cases of tuberculosis complicating pregnancy, examined from one to three years after the termination of pregnancy. He believes that a sharp distinction is to be made between active and inactive tuberculosis, and that in the latter, operation is to be avoided. In 14 of these cases so treated, 13 after several years showed no increase in the tubercular process, although they had borne children and nursed them. When the tubercular process is active, and especially where it is in the first stage, pregnancy should be promptly interrupted, and sterilization practised. Even when there are cavities in the lungs, and although the patient may be in the latter months of pregnancy, the progress of the tubercular process is delayed by the interruption of gestation.

Martin's proposition to remove the uterus and appendages in tuberculous pregnant patients is criticised by Henkel.¹ He has in all performed 8 abdominal total extirpations in pregnant tuberculous patients. These operations were characterized by very little hemorrhage and by the loss of but one patient.

Autopsy in this case revealed chronic ulcerating tuberculosis in both lungs, with cavities, chronic pleurisy, ulcerating tuberculosis of the intestine, and beginning peritonitis. This patient was six months advanced in pregnancy and had grown rapidly worse since pregnancy began. She was admitted to the hospital with considerable fever. She died on the sixth day after operation.

One patient was operated on just before the termination of pregnancy by the Porro Cesarean operation. In 2 cases operation was done

¹ Archiv f. Gynäkologie, 1911, Band xciv, Heft 2.

in the eighth month, 1 in the sixth, and 1 in the fourth month. The results were exceedingly good. One case of tuberculosis, nine months after operation, was much improved, while 2 other cases have increased much in weight since the operation. It was not expected that the tuberculosis would be greatly influenced by the operation, but most of the patients were in better general health and much stronger.

Fetzer would not operate in the presence of considerable fever, but in 3 cases operated with subnormal temperature. He observed that within four weeks of operation there was gain in weight, and in no case a rapid loss. He prefers the abdominal method of operation. When the tubercular process is just beginning, therapeutic abortion should be performed, followed by sterilization.

Pregnancy Complicated by Various Conditions. Brickner¹ contributes a paper upon *progressive deafness complicating pregnancy*, and reports 3 cases. He reviews the literature of the subject and concludes that pregnancy influences women who have autosclerosis or chronic progressive deafness, unfavorably, although the nature of the pathological process is by no means clear. The deafness increases immediately on the advent of pregnancy, grows worse during gestation, and remains permanently worse after delivery. Repeated pregnancies make the hearing progressively worse. The interruption of pregnancy may preserve the hearing existing at the time, but it will accomplish no more than this, as the deafness may subsequently increase.

The obstetric treatment for these cases is the induction of abortion early in pregnancy, so soon as it has been established clearly that pregnancy is causing the hearing to become worse. The right to render these patients sterile depends upon the circumstances in the individual case, which must be carefully considered.

MALARIA COMPLICATING PREGNANCY. Laffont,² of Algiers, finds that malaria influences pregnant women in the following manner: In chronic malaria, fecundity is diminished; in acute malaria, abortion is more frequent; while in chronic malarial intoxication, premature labor is more often observed. Pregnant women attacked by malaria go to full term most often when they receive treatment for the malarial condition. The exact cause for the interruption of pregnancy in these cases is not known.

Malaria may be a predisposing cause to eclampsia. The transmission of malarial intoxication from mother to fetus is clearly established. Malarial intoxication of maternal origin can be clinically divided into congenital malarial intoxication and heredity. The congenital variety is embryonal or fetal, in proportion as it is transmitted from the mother, or undergoes development in the embryo or in the fetus.

While it is difficult to actually demonstrate embryonal intoxication

¹ American Journal of Obstetrics, June, 1911.

² L'Obstetrique, 1911, No. 9.

with malaria, the clinical fact must be admitted. In fetal malaria the characteristic organisms can be demonstrated from the blood of the fetus, and clinically one can observe in the fetus during pregnancy the characteristic manifestations of malarial fever. Hereditary malarial intoxication may manifest itself after birth in the acute form, in a chronic form, or a latent intoxication. The last variety can be demonstrated by a microscopic study. In these cases the symptoms often develop some months after birth very gradually, without acute attacks. The diagnosis can only be made by continued observation.

Tertian and quartan forms are those most often transmitted from mother to fetus. In cases of malarial intoxication, with repeated attacks not yielding to quinine, transmission from mother to child does not always take place. This phenomenon is observed more frequently in the milder cases. When malaria develops during the last three months of pregnancy the transmission of the organism from mother to fetus is most apt to occur. The absence of organisms in the fetal blood does not always signify that the fetus is immune to malaria. In the present stage of our knowledge there is no explanation of the fact that in some cases the placenta is permeable to malarial organisms, while in others it resists them.

An infant born at term from a mother having malaria is often feeble and under weight. It is very rarely normal in health and vigor. Malformations are very uncommon.

We do not yet know the exact cause of fetal death from malaria. The mother's chills, fever, and lesions of the appendages are not sufficient to account for it. It is most reasonable to assign contagion and fetal intoxication as an essential factor.

One does not find in these cases any characteristic lesion in the placenta to which one can ascribe either the interruption of pregnancy or fetal death, and we do not understand the manner in which the malarial organism passes into the body of the fetus. Pregnancy does not confer immunity to malaria, nor is it a predisposing cause. When a malarial patient becomes pregnant, an exacerbation of malaria usually takes place, especially in the later months of gestation. Chronic malaria is often transformed in the mother into the pernicious variety. The so-called larval malaria is rarely observed during pregnancy.

As regards the influence of malaria upon labor in the acute variety, these patients often have rapid parturition; while in the chronic variety labor may be delayed. In rare cases there is observed a marked retraction of Bandl's ring. Malaria creates a predisposition to hemorrhage during labor, which is rarely severe. Obstetric operations are often required in these cases.

In the puerperal state, in those patients recently confined, the mother is often weak and subnormal temperature is frequently observed. The uterus undergoes involution very slowly, blood lochia is prolonged,

and intermittent hemorrhage is present. In active malaria intermittent mammitis is present, while in chronic malaria the milk is thin and watery and the secretion often fails. There is no evidence that the malarial organism can be transmitted from mother to child by breast milk.

During the puerperal period malarial intoxication may return in an aggravated form, usually before the ninth day. Malarial manifestations usually differ from those occurring during pregnancy. The regularity of the attack is modified, and also its gravity.

The prognosis is usually good. The differential diagnosis of malaria complicating the puerperal period may only be made by a microscopic study.

In the question of treatment, there has been much discussion as to whether quinine, administered for malaria to pregnant women, might not induce abortion or premature labor. The writer concludes that while quinine may stimulate labor when parturition has begun, yet it has no such influence upon the uterus before the beginning of pregnancy. Quinine should be given to pregnant malarial patients as if they were not in the pregnant condition. Among other methods, quinine may be given in doses of from $1\frac{1}{2}$ to 2 grams daily in small quantities during several hours preceding the elevation of temperature, and continued for some time after the chills and fever. By this the effort is made to destroy the young organisms during the period of their development. In general, quinine is best given to malarial pregnant patients in divided doses rather than in one dose. In the puerperal period quinine may be freely given to a nursing mother, and lactation should not be abandoned unless the malarial intoxication is pernicious, the mother cachectic, or where it is feared that the child may become infected. Women who suffer in the pregnant period with intermittent hemorrhage may be successfully treated by quinine. As regards the fetus, however, our most successful treatment consists in the cure of the mother during pregnancy, and this should be carried out as thoroughly as possible. Daily doses of 15 to 25 decigrams should be given to pregnant patients living in malarious countries, when the possibility of infection is present, and should be continued for some time afterward. Pregnant patients should be energetically treated with quinine not only in the interests of the mother, but of the child. After its birth the infant that has become infected *in utero* may be treated like any other patient.

THE INFLUENCE OF ALCOHOL IN PREGNANCY. Gentili and Cambazzu¹ contribute the results of an elaborate study upon the effect of alcohol upon the pregnant patient and the fetus. They find that the introduction of alcohol by intravenous injection or subcutaneously, for a considerable time, causes degenerative lesions in the principal organs of

¹ Annali di Ostetricia, 1911, No. 9.

the body. This did not depend so much upon the number of injections as upon the resisting power of the organism. The effects of these injections do not pass off for several months after they are suspended. Fecundity is lessened by these injections. The resistance of the pregnant patient and of the fetus is less than that of other animals. The sterility induced by alcohol is not the direct result of the influence of alcohol upon the genital organs, but is caused by the general deterioration in organic function. The introduction of alcohol in a pregnant animal causes organic changes which renders the animal more liable to death than in the non-pregnant state. In some, the introduction of alcohol may be apparently well borne without the interruption of gestation, the fetus being carried to term; in others, fetal death follows. In cases where pregnancy is uninterrupted, an animal will repeatedly bear ascending doses of alcohol. The weight of the young, when the mother is treated by injections of alcohol, is less than that of the normal, and this apparently results from interference with the mother's processes of nutrition. Alcohol undoubtedly passes from the maternal to the fetal organism, producing changes in the liver and kidneys. When fetal death occurs during pregnancy, it seems to result from the inability of the maternal organism to dispose of the alcohol injected. When the embryo is retained in the womb, the process of mortification follows.

RECURRENT MASTITIS IN PREGNANCY RESULTING IN THE DEATH OF MOTHER AND CHILD. Bertoloni¹ reports the case of a pregnant patient who died from suppurative mastitis. Autopsy showed the left breast extensively infected and suppurating; septic pleurisy; septic peritonitis, and endometritis.

Bacteriological examination showed the presence of the *staphylococcus pyogenes albus*.

The fetus was nearly at term, with congested meninges, multiple hemorrhages in the larynx and throat, and congestion and increase in the size of the thymus glands. There were petechial spots of hemorrhage in the lungs, in the pleuræ, and pericardium. The abdominal viscera were congested, the intestinal canal almost empty of meconium, but distended with gas. The spleen was increased in size and there were multiple hemorrhages in the kidneys.

Hemorrhagic sepsis was the cause of death. The same germ present in the mother was found in the child.

ANGIOMA OF THE TONGUE COMPLICATING PREGNANCY. Sirtori² reports an interesting and unusual case of angioma of the tongue complicating pregnancy, and illustrates his paper with an excellent colored drawing.

CHOREA FOLLOWING THE INTERRUPTION OF PREGNANCY. Bossi³ reports the case of a patient, aged eighteen years, previously healthy, who married in her seventeenth year, and whose first pregnancy was

¹ *Annali di Ostetricia*, 1911, No. 9.

² *Ibid.*, No. 5.

³ *Zentralblatt f. Gynäkologie*, 1911, No. 49.

interrupted without known cause, at the seventh month. The fetus survived but three days.

The mother got up on the eighth day, and two weeks later suffered from metrorrhagia. A month later she had a severe attack of fever, with pains through the muscles and joints, and great prostration. Choreic movements developed, and the patient walked with great difficulty. There was a reddish discharge from the uterus, and the patient complained of pain in the left lower portion of the abdomen.

Upon admission to the hospital she became actively hysterical and sleepless, with almost constant motion, not severe. She was mentally much disturbed.

Upon examination, the uterus was retroverted, the cervix torn on the left side, with chronic endocervicitis and subinvolution. There was a discharge of pus from the uterus.

The patient was treated by curetting, closure of the cervix, and the fitting of a pessary. She made a practically complete recovery.

THE TREATMENT OF PERNICIOUS ANEMIA COMPLICATING PREGNANCY. Bauereisen¹ reports 2 cases of pernicious anemia complicating pregnancy. He calls attention to the good results obtained by Grawitz who administered albumin very freely by the mouth and by the rectum, with irrigation of the stomach and intestine, and the free administration of arsenic and hydrochloric acid. Weber treated these cases by the intravenous injection of 5 c.c. of blood, and Huber by intragluteal injection of 20 to 50 c.c. defibrinated blood weekly.

The administration of glycerin by the mouth has also been recommended.

Bauereisen's first case was a patient pregnant six months, suffering from pernicious anemia. Two days after admission to the hospital the fetus was expelled. From 6 to 10 c.c. of blood were injected, first subcutaneously, then into the muscle substance. The blood was taken from the vein of the person giving it, and immediately injected—in all, five doses being given. Six weeks after the injection the erythrocytes and hemoglobin had notably increased. The patient was discharged from the hospital much improved. Since then she has suffered from prolonged and profuse menstruation.

The second case was that of a multipara who had suffered from anemia at various times. At labor, hebstiotomy was performed for contracted pelvis. The patient bled considerably during labor, but the bleeding was controlled. The skin was pale and waxy, the mucous membranes colorless. The red cells numbered 1,600,000, hemoglobin, 25 per cent. The red cells showed numerous and anomalous forms.

The patient was first treated by rest in bed, and by the usual methods. She grew worse, and 5 to 10 c.c. of blood were injected daily into the

¹ Zentralblatt f. Gynäkologie, 1911, No. 33.

intramuscular tissues—the patient receiving in all seven injections. Almost immediate general improvement followed the first injection, and ten weeks after treatment began an examination of the blood showed improvement. The red blood cells increased to 3,000,000, the hemoglobin to 40 per cent. The patient's child showed no signs of anemia, and has developed normally.

Ventral Extirpation of the Pregnant Uterus for Hemorrhage and Infection. Sippel¹ reports the case of a multipara five months pregnant, who had suffered for two months with intermittent hemorrhage. After admission to the hospital it was necessary to use the gauze tampon eight times to control bleeding. The uterus was the size of a seven months' gestation, with the right cornu very much developed. The cervix was long and undilated. The urine contained no albumin, the other organs were sound.

The diagnosis suggested blighted ovum, placenta prævia, or premature detachment of the normally situated placenta. It was decided that the patient had placenta prævia and beginning infection. It was thought best to perform total extirpation by the abdominal route, which was done, with drainage with iodoform gauze.

The patient died thirty-six hours after the operation from acute septic infection.

On autopsy, the ovum was in the right cornu, which had gradually developed. The placenta was adherent to the uterine wall. The uterine cavity was filled with a clot, which had evidently become infected from the vaginal bacteria.

Pyelonephritis of Pregnancy with Autopsy. Williamson and Barris² report the case of a primigravida, aged nineteen years, admitted to St. Bartholomew's Hospital, with fever, rapid pulse, resistance over the right kidney, and lessened pain over the left. The urine was acid and the *Bacillus coli communis* was not present, but the paratyphosus organism was present in large quantities. The leukocytes were 6800, and no culture was obtained from the blood nor from the feces.

The patient was treated by rest, milk diet, urotropin, and potassium citrate. She became better, with a normal temperature, and the urine was free from pus. After six days of normal temperature, the ureters were catheterized under anesthesia, obtaining from the right kidney colorless urine without pus and containing a coliform bacillus. The patient died twelve hours after the examination.

On autopsy, about half a pint of slightly blood-stained fluid was found in the left pleural cavity. Cultures taken from the amniotic liquid gave a few colonies of staphylococci; the placenta was friable; otherwise normal. The fetus of six months was macerated. Cultures

¹ Monatschrift f. Geburtshülfe und Gynäkologie, 1911, Band xxxiii, Heft 3.

² Journal of Obstetrics and Gynecology of the British Empire, November 19, 1911.

taken from the child's blood were sterile, and the placenta showed no organisms.

The right ureter was dilated above the brim of the pelvis, its wall reddened and swollen; the left ureter was somewhat dilated throughout its entire length. It contained purulent fluid, with pure cultures of the *Bacillus paratyphosus*. In the right kidney there were two small abscess cavities in the cortex with necrotic material and pure culture of the *Bacillus paratyphosus*.

On microscopic examination the epithelia were degenerated, the bloodvessels engorged with hemorrhages into the interstitial tissue, and glomeruli. The left kidney contained pus with the same micro-organism.

The evidence pointed to an infection by the blood stream rather than an ascending infection from the bladder.

Cervical Pregnancy. Rubin¹ reports the case of a patient in her second pregnancy who when three months pregnant was seized with pains in the lower abdomen and frequent urination lasting for two weeks. Later, she was again seized with violent pains in the right lower portion of the abdomen. Repeated attacks of pain finally culminated in fainting, abdominal distention, and thready pulse. There was apparently free fluid in the abdomen.

Upon vaginal examination the external os was closed, the cervix enlarged and soft, and the pouch of Douglas boggy and tender. The diagnosis of ruptured ectopic gestation was made. At autopsy, the peritoneum was full of free and clotted blood. The uterus was wedged in the pelvis, its anterior wall greatly thinned, and at the extreme left border of the anterior surface a rupture about the size of a silver quarter. During the hysterectomy, the rent was made in the lower portion of the thin anterior uterine wall, followed by the escape of amniotic liquid, and a fetal extremity. To make the hysterectomy more easy, the fetus was extracted through the rent. It was noticed that placental tissue was left behind in the cervix when the transverse incision was made. The uterus was removed containing the placenta.

Upon studying the specimen, an extreme degree of placenta prævia was present. Cervical glands were found in the tissue opposite the placental attachment, showing that a cervical pregnancy was present. The insertion of the uterine vessels and the lowermost points of flexion of the uterine serosa corresponded with the uppermost limit of placental attachment. The placenta must have begun its development at or very near the isthmus and internal os, and developed rather toward the vaginal portion than toward the fundus of the uterus.

A review of the literature of the subject shows that the cervix can become elongated to a remarkable degree in cases of cervical pregnancy, and also in myoma of the uterus. Spontaneous rupture of the uterus

¹ Surgery, Gynecology, and Obstetrics, December, 1911.

may occur as the result of cervical implantation of the placenta. The abnormal situation of the ovum was responsible for the great thinning in the uterine wall.

Rupture results from erosion by syncytium and from increase in intracervical tension. The fact that the uterus does not rise normally out of the pelvis, but that the cervix is held firmly within the bony pelvis, also predisposes to uterine rupture.

To prove that cervical pregnancy with attachment of the placenta to the cervix is present, it must be possible to demonstrate the cervical glands opposite the attachment. The placenta and cervix must be intimately attached. At least, a considerable portion of the placenta must be situated below the entrance of the uterine vessels, or below the peritoneal reflection of the anterior and posterior surfaces of the uterus. The fetal elements must not be found in the body of the uterus.

Isthmicocervical Pregnancy. Under the title "Isthmicocervical Pregnancy," Devraigne¹ reviews the literature of cases in which the ovum is attached in the isthmic portion of the cervix. He quotes Tarnier's case, 1887, which resulted fatally, and at autopsy a fibroma was found projecting into the cervix, and at the border of this the attachment of the placenta, showing that the pregnancy was a cervical one. The internal os had been displaced by the fibroma, which had essentially altered the anatomy of the uterus.

The writer also reports a case which he observed in Tarnier's clinic, of a multipara pregnant six months. The patient complained of pain in the lower portion of the abdomen, with general edema, headache, distress of vision, and sensation. She doubted whether the child was living.

To relieve the edema, the patient was put upon a milk diet, with rest in bed. The uterus gradually developed to about the size of four months, and, when the patient entered the hospital, examination showed the ovum very low in the uterus, with a hard body at one cornu of the uterus, which was either a fibroma, a uterine cornu, or a bicornate uterus. There was some hemorrhage and the patient was threatened with abortion.

Under anesthesia, the ovum was found inserted on the left side of the uterus, with the cervix and lower uterine segment considerably distended. The product of conception was easily removed, but the placenta could not be delivered, and the uterus was tamponed. The placenta was gradually expelled, and repeated examination showed that the ovum had not been in the body of the uterus but had lodged in the cervix and lower segment and had enormously distended the lower segment. The patient's recovery was complicated by high temperature for several days, but upon her discharge from the hospital

¹ L'Obstetrique, 1911, No. 11.

she was in good general condition and the uterus normal in shape and size. No evidence of abnormality or tumor could be detected.

Devraigne believes that cervical pregnancy can be diagnosed when the ovum entirely develops in the isthmus and cervix, and when the cavity of the uterus is entirely free.

In 16 cases which he has collected, two circumstances are of interest, namely, the age of the patient and the question of primiparity or multiparity. In the 16 cases, the age of 3 was unknown. The rest ranged from thirty-three to forty-six years. Only one of these patients was a primipara—the patient described by Tarnier, aged thirty-nine years, with fibroid tumor of the uterus. Most of the patients had borne several children—one of them thirteen. The complication is most likely to develop in cases in which the uterus has been repeatedly distended but the endometrium remains healthy.

The symptoms of this condition are pain, hemorrhage, and sometimes disturbance in the functions of the urinary bladder. That these are serious cases may be inferred from the fact that abdominal hysterectomy was practised in one, and vaginal hysterectomy in two.

The mortality for the mothers was 9, with 6 recoveries, 3 treated by operation, and 3 without operation. So far as the fetus was concerned, 6 cases aborted, and among those going to near term, 3 children died before delivery was effected, 2 were born living, and 1 born living by abdominal Cesarean section. The others died from hemorrhage.

The diagnosis seems to be somewhat difficult, but if all patients having hemorrhage during pregnancy could be subjected to a thorough examination, the diagnosis should not be impossible.

So far as treatment is concerned, in early pregnancy the tampon may be used if severe hemorrhage is absent, until the conditions are favorable for emptying the uterus. When the child is viable, unless spontaneous labor speedily develops, the uterus should be emptied by abdominal section, followed by hysterectomy if bleeding does not promptly cease. If operation is undertaken through the vagina, the placenta may occasion considerable difficulty.

Apical Pregnancy. A case of apical pregnancy is reported by Grad.¹ The patient, aged thirty-five years, stated that she had missed two periods, and suffered great abdominal pain with constant nausea. She had had considerable hemorrhage. Bimanual examination disclosed an enlarged and exceedingly tender uterus. The examination was soon followed by hemorrhage, bearing-down pains, and some rise of temperature, with normal pulse.

Under anesthesia, the uterus was irregularly enlarged, the left cornu feeling like a fibroid tumor. The uterine cavity was three and a half inches deep. On exploration, it was empty. A diagnosis of ectopic gestation with fibroid was made, and operation advised. Forty-eight

¹ American Journal of Obstetrics, January, 1911.

hours later pain and hemorrhage developed, with the expulsion of a small fetus without membranes. Under anesthesia, the cervix was thoroughly dilated, when the finger entered a large cavity at the left cornu from which membranes were removed, and the uterus packed. Three days later chill and fever developed caused by retained secundines, whose removal was followed by recovery.

This pregnancy is considered apical or tuboövarian, and is illustrated by drawings made from the specimen. Three cases from the American literature of the subject are quoted.

Interstitial Pregnancy. Five cases of interstitial pregnancy are reported by Lequieux,¹ and illustrated by excellent drawings made from the specimens. In the first case the patient died soon after admission to the hospital, and autopsy showed an empty uterus with a ruptured fetal envelope, the ovum having originally developed in the wall of the uterus.

The second case in Tarnier's clinic gave some difficulty in diagnosis, but, on operation, a small tumor was found at the left cornu of the uterus. This portion of the uterus was resected, the patient making a good recovery.

Upon examination, it was found that the tumor was a blighted ovum whose original development had been within the uterine wall.

The third case had suffered from pain and hemorrhage, the uterine cavity had been found empty, and the patient was sent to the hospital, having an abdominal tumor the size of a fetal head. On section, the tumor was adherent to the omentum and contained chocolate-colored liquid. Hysterectomy was performed, which was difficult because of the adhesions.

Upon examining the specimen, the body of the uterus was in front, and behind it the fetal sac, at about five months. The placenta was inserted in tissue which had been the wall of the uterus.

The fourth case was admitted after severe hemorrhage, the uterus being irregular in contour with the right cornu enlarged. On section, the case was diagnosticated as interstitial pregnancy, and hysterectomy was performed. Examination of the specimen confirmed the diagnosis.

The fifth case could give no clear history, but had suffered abortion, she stated, six weeks previously. The pulse and temperature were somewhat raised. She complained of great pain in the abdomen, especially in the left iliac fossa. The lochial discharge was offensive, and the pulse and temperature rose.

Upon attempting to explore the uterine cavity, it was found sufficiently large for a six weeks' gestation. The *ecouvillon* was used, followed by the injection of iodine with the use of a tampon. The patient complained afterward of considerable pain, and very shortly afterward she was seized with great suffering, tonic convulsions, excite-

¹ *L'Obstétrique*, 1911, No. 5.

ment, coma, and death in less than three-quarters of an hour. It was thought that the uterus had been perforated either by the treatment in cleansing its cavity, or by a previous criminal abortion.

On autopsy, the pregnancy had been in the wall of the uterus at the left cornu where the embryonal cavity had developed. Traces of the amnion were found, while the villi of the chorion had penetrated the uterine wall. Infection had occurred at the time of the abortion. No cause could be found to explain the sudden death, except intense congestion of the lungs with beginning edema.

The frequency of this condition is estimated by Werth, who found 1 case in 120 in ectopic gestation. Rosenthal, 40 cases in 1314 ectopic gestations, giving an apparent average of 1 in 70 to 75 ectopic gestations. Mauriceau seems to have been the first who described the condition.

The distinction must be made in these cases between pregnancy in the cornu and pregnancy in the uterine wall, which seems to follow the development of uterine flexion. Apparently differences in the insertion of the round ligament seem to have something to do with the development of this abnormality. The peripheral extremity of the tube is most often upon the inferior border of the tumor in these cases. In some, however, it is found more lateral, and this seems to have had some influence on the original nidation of the ovum. In cases of interstitial pregnancy, a layer of muscular tissue is interposed between the uterine cavity and the tubal cavity.

As regards the histology of the sac, the presence of a layer of muscular tissue between the uterine cavity and the ovum indicates the existence of an intramuscular interstitial pregnancy, or an interstitial pregnancy, canalicular in variety, and of tubal evolution. The absence of the muscular tissue implies that the interstitial canalicular pregnancy was of uterine evolution.

Most of these cases rupture between the second and third months, next in frequency being the third month, and between the fourth and fifth months.

If surgical treatment is indicated, the question of resecting the uterine wall or of performing hysterectomy must be settled by the conditions present in the individual case.

The interesting question of the possibility of normal pregnancy in patients who have previously had ectopic gestation is discussed by Essen-Möller.¹ His observations embrace 56 cases, 55 of which were operated upon for ectopic gestation, and all of the 56 recovered. One patient was forty-eight years old; 7 patients gave birth to living children after operation; in 5, both Fallopian tubes were removed; 2 patients died of pulmonary tuberculosis after operation; and in 2 cases the microscope showed hematosalpinx in the tube without the villi

¹ *L'Obstétrique*, 1911, No. 3.

of the chorion; in the remaining 39 patients, 24 had normal pregnancies, 1 giving birth to twins; 2 had abortions, 1 after giving birth to two living children, the other following the birth of one living child; 2 had tubal pregnancies, 1 giving birth to a living child.

Of the 28, the healthy tube had performed its function normally twenty-seven times; 11 patients had one pregnancy; 5 had two pregnancies; and 2 had three pregnancies after the operation.

The interval at which conception occurred after operation varied from one month to five years. Pregnancy seems more apt to occur in cases that were not treated by abdominal drainage at the time of operation. In the case which recovered from tubal pregnancy without operation, normal pregnancy subsequently developed.

The Treatment of Retroflexion of the Pregnant Uterus. Graefe¹ has collected 200 cases of retroflexion of the pregnant uterus, in which 61 gave no symptoms of any complication. These patients came to a physician, not because the retroflexed uterus troubled them, but to obtain a diagnosis of pregnancy. Forty-one of these patients were at the end of the second month, 16 near the end of the third month, and 4 at the end of the fourth month; 2 of the cases were complicated by myoma of considerable size, which seemed to cause no distress. In 2, the uterus seemed limited by adhesions, but pregnancy developed normally in spite of this. These patients complained of backache in the sacral region, which disappeared when uterine catarrh and erosion of the cervix ceased.

In contrast with these 61 cases are 25 in which the patients complained of backache, and 18 in which there was pain in the back and lower abdomen. In 11 of these cases the pain persisted, although the uterus was replaced and maintained in anteversion by a pessary; 3 cases had profuse purulent catarrh of the cervix.

The general condition of these cases was very bad, but the symptoms disappeared when the patient's general health was restored. In one case, the retroflexion returned after the uterus was replaced, followed by the renewed development of pain. In one case, the uterus was not only retroverted but somewhat prolapsed, and pain was distinct. In 7 cases, the pain in the back became cramp-like in character and was followed by abortion. In only 19 cases could the back pain be distinctly traced to the retroflexion. These patients had bearing-down sensations also. But 17 cases complained of pronounced bearing-down sensations, and 7 of pressure on the rectum; 25 had difficulty in the functions of the bladder with increased micturition; 1 patient complained of pain in the lower extremities which did not disappear when the uterus was replaced.

Among the 200 cases there were 31 abortions, 15 soon after the uterus was replaced; 9 about the fourth week; 4 from the sixth to the eighth

¹ *Monatsschrift f. Geburtshülfe und Gynäkologie*, 1911, Band xxxiv, Heft 1.

week; and 3 from the third to the fourth month after the reposition of the uterus; 2 patients had criminal abortion produced upon them; 3 were syphilitic; and 2 had gonorrhea.

In cases in which abortion occurred some time after the replacement of the uterus, it could not be traced to the altered position of the womb. In 15 cases a distinct relation existed between the retroflexion and abortion; in 10 patients the retroflexed uterus became incarcerated; and 8 of them suffered from ischuria; in 1, the urinary bladder reached to the umbilicus; and in 1 the bladder was distended until it contained four and a half quarts of urine; in 8 of these patients, pregnancy went on undisturbed after the replacement of the uterus. Abortion occurred in 1, three months after replacement; in others the accident happened at varying periods.

The most successful method of replacement consisted in emptying the urinary bladder thoroughly by catheter and placing the patient in the knee-chest posture, distending the vagina, and pushing the fundus up. In one case of incarceration in the anteflexed uterus where all efforts at replacement under anesthesia had failed, an elastic bag was placed in the vagina and moderately distended with fluid, and the displacement of the uterus was removed by the pressure of the bag. In cases of retroflexion which resisted replacement, the uterus was raised as far as possible, and a Hodge pessary inserted. Even in cases where there seemed to be adhesions present this method was successful in 7. Pregnancy went on to its normal termination without complication.

He reports the case of a pregnant patient who had retroflexion of the uterus with adhesions which resisted all efforts at replacement. Under anesthesia, the abdomen was opened and a myomatous tumor was found with a broad base on the anterior wall of the uterus. It was so situated that the uterus could possibly develop normally during gestation. Accordingly no operation was performed, excepting the lifting of the uterus up out of the pelvis. The myomas did not grow during the pregnancy, which terminated in normal delivery. Six months afterward the tumor was the size of a hen's egg and lying above the bladder.

None of these cases seemed suitable for the performance of fixation of the uterus through any methods of suture. In cases where abortion has occurred, the attempt to maintain the uterus in a suitable position is justifiable either by ventrosuspension or by some modification of the Alexander operation. The suprasymphyseal section is of value in these cases. In one case, the Alexander-Adams operation was performed on a patient before the diagnosis of pregnancy was made. In these cases pregnancy proceeded without interruption and came to a normal termination.

Fibromas of the Uterus Complicating Pregnancy, Labor, and the Puerperal State. Lobenstine¹ gives his results in the study of 100 cases in the New York Lying-In Hospital. He finds that during pregnancy, labor, and the puerperal state in some instances slight changes occur in these tumors, while in others the alterations are marked. In a typical case, the tumor undergoes hypertrophy as well as hyperplasia of all its elements, with edema. This is caused by vascular changes, tension of the capsule, direct pressure on the growth, or torsion of the pedicle. The change in size may be so great that a small sessile tumor at the fundus may become apparent on inspection of the abdomen: or a small interstitial tumor in the lower zone may fill the pelvis. The shape of the tumor often changes from round to oval or irregular. In myomas of the cervix or lower segment, the tumor may change its position in the latter part of pregnancy and in the early stage of labor. This results from expansion from the increasing size of the uterus and the drawing up of cervical tissue as labor begins.

After labor, involution may be rapid or slow. In typical cases the tumor becomes denser, rounder, and gradually resumes its original position. The smaller tumors may disappear entirely in from three to eight weeks. In repeated pregnancies these changes do not occur typically.

The pathological changes are those of nutrition caused by interference with the circulation of the tumor in both its blood and lymphatic supply. When the pedicle is twisted, or a tumor becomes incarcerated in the pelvis, changes in the nutrition develop, and hyaline and fatty degeneration are observed. Should infection occur, such a tumor may become necrotic, gangrenous, or may suppurate. The streptococcus, staphylococcus, colon bacillus, and gonococcus, may be found in these cases.

Gangrene develops most often in the early portion of the puerperal period. The infection with gangrene and suppuration is seen most often in large submucous tumors, the least often in the sessile subserous variety. In pedunculated tumors, gangrene may start near the centre of the tumor, while in submucous growths the gangrenous process usually begins beneath the capsule. Gangrene may also develop from a small hemorrhagic area.

From 25 to 30 per cent. of women with fibroids do not conceive. Submucous growths interfere most seriously with pregnancy. Pathological conditions of the tubes and ovaries often accompanying these tumors, may also produce sterility. Abortion is more common than in normal cases, and may be followed by hemorrhage and a mechanical difficulty in emptying the uterus.

Where pregnancy goes on, in the vast majority of cases symptoms are not pronounced, and may be practically absent. When present,

¹ American Journal of Obstetrics, January, 1911.

there is excessive vomiting, abdominal pain, sciatic pain, tenderness with abdominal symptoms, an increased tendency to placenta prævia, accidental hemorrhage, and premature labor. Complications in the tubes and ovaries may produce additional symptoms.

In the majority of cases, labor proceeds without serious complications. Hemorrhage, however, may occur, the placenta is often adherent, the cord may prolapse, the mechanism of labor be abnormal, and spontaneous birth may be impossible because of the obstruction occasioned by the tumor. Rupture of the uterus is more likely to occur.

In the puerperal state there is more pain than usual and more profuse lochia. When gangrene or infection develop, pain and tenderness are increased, disturbances in pulse and temperature develop; there may be chills, and a marked leukocytosis is present. A foul vaginal discharge, distended and tender abdomen, and vomiting, are observed.

In the early days of the puerperal period it is difficult to decide whether a mild infection is present. Submucous tumors may be spontaneously discharged with hemorrhage. Rarely a subperitoneal or interstitial tumor may rupture through suppuration into the peritoneal cavity.

In these cases, the average age was twenty-eight and one-half years—primiparæ, 43 per cent.; multiparæ, 57 per cent. One-fourth of the tumors were pedunculated, 21 per cent. submucous, 45 per cent. interstitial, 9 per cent. subserous; there were 44 per cent. as large as a fetal head at birth; the remainder were smaller.

There was but one tumor in 63 per cent.; more than one in 37 per cent.; in one-third of the cases the tumor was in the lower zone of the cervix; in the upper part of the uterus in 67 per cent.; in over one-half upon the anterior wall.

There were 13 spontaneous abortions among these patients, and 2 after operation. During labor the vertex presented in 65 cases, the breech in 6, and the shoulder in 14. All had hemorrhage at delivery, and 14 severe bleeding. It was necessary to tampon the uterus in 11 cases. The placenta was adherent in 4.

The tumors were becoming gangrenous in 6 patients, and 9 had marked fever during the puerperal period.

The maternal mortality was 4—1 from intestinal obstruction in the puerperal period, 2 from shock and sepsis, and 1 from gangrene and sepsis. The fetal mortality was 6.

In 85 patients delivered at or near term, it was necessary to perform version in 3 cases, high forceps in 2, medium forceps in 3, and low forceps in 7. Cesarean section alone was done in 4 cases, and followed by hysterectomy in 2. Abdominal section was performed in a little over 7 per cent. of the cases; the more common obstetric operations in 17.6 per cent.; myomectomy during pregnancy was done but twice; one went to term, the other aborted on the following day.

In the puerperal period there were 2 complete abdominal hysterectomies for sloughing fibroids; 1 supravaginal hysterectomy, 3 vaginal myomectomies for sloughing tumors, and 1 for a submucous tumor causing hemorrhage. Severe pain in a patient having a subserous fundal myoma called for abdominal myomectomy. The other patients were advised to postpone operation until they had recovered from the puerperal period.

As regards operation—uncomplicated cases require little or no interference. Abortion, although spontaneous, is always a serious matter, and abortion should not be induced. Severe bleeding calls for hysterectomy. In complicated cases, myomectomy or hysterectomy is indicated.

During labor, the danger is not so much from actual dystocia as from injuries to the tumor, which may result in hemorrhage, gangrene, or infection.

In general, myoma of the uterus predisposes to sterility and to abortion. If the early months of pregnancy are safely passed interference should not be practised unless necessity arises during labor. If spontaneous delivery can be accomplished, care must be taken not to wound or infect the tumor. Should unfavorable symptoms develop during the puerperal period, operation should at once be performed.

Traumatic rupture of the uterus during pregnancy is reported by Hinterstoisser.¹ The patient was a multipara who, shortly after she had felt life, was taken with colic and cramp-like pains, and vaginal hemorrhage. Bleeding continued for about a month at intervals, and finally ceased, the patient being able to continue her daily work. On admission to the hospital she gave a history of having been kicked in the abdomen. This produced intense abdominal pain, hemorrhage, and the cessation of fetal movements. Just before admission to the hospital the pain recurred without bleeding.

Upon examination, the abdominal tumor was the size of a six or seven months' pregnant uterus. Portions of the fetus could be outlined by palpation. A tumor of indefinite dimensions and position was found at the brim of the pelvis by vaginal examination. A sound introduced into the uterus passed in different directions, from 6 to 16 cm.

Examination under anesthesia showed the uterus firmly contracted, as large as a fist, with a soft tumor in the abdomen above the uterus. The tubes and ovaries could not be made out. The abdominal tumor was but little movable. The patient stated that she felt well, and expected the onset of labor in a short time.

Upon section, the omentum was adherent. Beneath this lay a sac so adherent that it was necessary to resect the omentum, when the sac ruptured and a brownish fluid escaped. A loop of intestine was

¹ Monatsschrift f. Geburtshilfe und Gynäkologie, 1911, Band xxxiv, Heft 6.

adherent to the cyst and was separated. From the cyst escaped brownish fluid containing vernix caseosa, and the cyst contained a dead fetus. The right tube and ovary were covered with a membrane which extended behind the uterus, and the left tube and ovary were thickened. The cyst, uterus, and adnexa were removed, and the wound drained. The patient had fever for three days after the operation, but made a good recovery.

Upon examining the specimen, the uterus had ruptured at the fundus, and the placenta was attached to the connective tissue of the uterus. The fetal sac had escaped through the rupture into the abdominal cavity. The point of rupture was near the left uterine cornu and the umbilical cord had ruptured at the time of the fetal escape.

Other similar cases are collected from the literature, and these cases should be considered as bursting of the uterus rather than rupture. The latter term is better applied to cases in which the uterine muscle tears during pregnancy, parturition, or efforts to deliver an impacted fetus.

PREGNANCY COMPLICATED BY OVARIAN CYST is the subject of a paper by Cova,¹ from Pestalozza's clinic in Rome. The literature of the subject is reported at considerable length. The writer describes in addition the case of a young woman, aged twenty-one years, a primipara, in good health before marriage, but afterward developing abdominal pain coincident with pregnancy.

Upon examination, a tumor was found in the abdomen resembling a fibroma or an ovarian growth. The latter was thought to be the probable diagnosis. The patient fell upon the pavement, striking upon her abdomen over the region of the tumor. This accident was followed by pain but not much shock. Examination showed extravasation of fluid into the abdominal cavity. Fetal heart sounds could be heard and were regular.

The diagnosis of rupture of an ovarian cyst was made. Symptoms of labor developed with slight dilatation of the cervix, and abdominal section was performed as soon as possible. A ruptured ovarian cyst on the left side was found, with the pregnant uterus. The cyst was removed, and labor shortly afterward developed, the child being delivered by forceps. Mother and child made a good recovery, with the formation of a good scar.

Abdominal Amputation of the Pregnant Uterus for Scar Tissue in the Cervix. Klein² reports the case of a patient who had passed through three normal labors, having been treated for six weeks for catarrh of the cervix by curetting and the application of caustic remedies. An operation had then been performed for the correction of a uterine

¹ *Annali di Ostetricia*, 1911, No. 10.

² *Monatsschrift f. Geburtshülfe und Gynäkologie*, 1911, Band xxxiii, Heft 4.

displacement, and the patient had twice been tamponed for abdominal pain and hemorrhage.

Upon admission to the hospital, dark bloody fluid was escaping in a small quantity from the vagina. The upper portion of the vagina formed a sac and the cervix could not be clearly made out. The mucous membrane was thickened and infiltrated. The ulcerated surface bled and the uterine canal could not be found even with a fine probe. The uterus was about four months pregnant, and had evidently been attached by suture to the anterior abdominal wall. No abnormality could be made out in the tubes or ovaries, and no heart sounds could be detected.

The diagnosis lay between a hematometra and pregnancy with atresia of the cervix.

An effort was made to improve the condition by vaginal douches, with the hope that the cervix would soften and pregnancy continue. Pain, however, developed to such intensity, with disturbance of pulse and temperature, that uterine rupture was feared and operation was undertaken.

Upon section, ventrofixation was found, with adhesions. The uterus was amputated through the cervix, the ovaries being left behind. The patient's recovery was complicated by abscess in the abdominal wall. The patient ultimately made a good recovery.

Upon examining the specimen, the cervix had practically been destroyed, and scar tissue had developed to such a degree that dilatation and the expulsion of the fetus would have been impossible.

Salpingostomy in Pregnancy. Gellhorn¹ reports his results in conservative surgery in the endeavor to preserve a patent Fallopian tube to permit the possible occurrence of pregnancy. In 3 cases, he has had the opportunity of examining patients on whom he had previously operated by conservative methods.

His first patient was one from whom he removed two intramural fibroids, with vaginal enucleation of a submucous fibroid and bilateral salpingostomy. Over a year afterward the patient had appendicitis, and at operation it was possible to observe the condition of the right tube. It was patulous, with two of the four linen sutures employed still in place. At the original operation the tube was the size and color of a loop of intestine; but at the second operation it had gradually diminished in size.

The second case was first operated on for appendicitis, and the appendix, right adnexa, and an interstitial fibroid removed. The left tube was occluded and salpingostomy was performed. The patient subsequently developed abdominal pain, and was operated on the second time four years afterward. A multilocular cyst was found upon the left side, with an occluded tube.

¹ Surgery, Gynecology, and Obstetrics, July, 1911.

In the third case, the first operation was for unruptured ectopic pregnancy, with removal of the right tube and ovary. Salpingostomy was performed upon the left occluded tube. The second operation was for appendicitis, when the tube was found again occluded.

These cases are reported to explain the failure, so far as conception is concerned, of cases operated upon by conservative salpingostomy.

Gellhorn believes that the operation is indicated where children are desired, when the occluded tube contains no infectious matter, and if the mucous membrane of the tube seems intact or capable of becoming normal. In a few cases, the operation has been followed by pregnancy. It adds nothing to the patient's danger, and in properly selected cases should be performed.

Injuries to the Eyes Caused by the Toxemia of Pregnancy. Weil and Wilhelm¹ draw attention to the injuries to the eye resulting from the various forms of the toxemia of pregnancy.

The first case reported was that of a woman, aged nineteen years, who had nephritis during childhood, followed by *edema of the lids* and *albuminuria*. The eye condition improved, but some traces of albuminuria remained. Pregnancy lighted up nephritis and was followed by pernicious nausea culminating in eclampsia at about the seventh month. The urine was highly albuminous. *Albuminuric retinitis* was present.

Following the introduction of an elastic bag, the patient expelled a macerated fetus. The examination of the eyes showed marked congestion and hemorrhage, and lumbar puncture was performed to remove the excessive pressure. The patient's general condition improved under appropriate treatment, and her sight grew sufficiently better so as to enable her to read large print. The patient was kept under observation, her general health steadily improving, and she finally regained practically normal vision with only slight traces of the original retinitis.

The interesting point about this case is the fact that lumbar puncture was made several times, and on each occasion the fluid contained an abnormal percentage of urea. The writer describes the case as one of ozotemia. This was thought to result from the physiological changes of pregnancy and also from mechanical obstruction to the ureters. The examination of the patient's blood showed an increased percentage of urea.

The writer also reports 2 cases of patients suffering from eclampsia, one of whom gave birth to a dead child, the other to a living child, at eight months. Each had sudden disturbance of vision during the eclamptic crises, with almost total loss of sight. The ophthalmoscope failed to find essential lesions in the eye. The examination of the blood

¹ L'Obstétrique, 1911, No. 3.

and lumbar puncture showed a considerable percentage of urea in the cerebrospinal fluid and in the blood.

The reviewer recalls the case of a young married woman who suffered severely from nephritis in childhood, following scarlet fever. In three successive pregnancies she had albuminuria, terminating in the birth of two living children and one dead fetus. In each pregnancy her sight became gradually lessened so that partial blindness was present. She finally made an almost complete recovery, with but a trace of albumin and no casts in the urine, and with almost normal vision. The ophthalmoscope revealed intense congestion with some hemorrhage.

The reviewer has at present under observation a vigorous woman who has borne one living child and two stillborn children, one pregnancy terminating in severe eclampsia followed by prolonged unconsciousness. Great impairment of vision accompanied this, for which an absolutely unfavorable prognosis was made. The patient then consulted eminent ophthalmologists in Europe, one of whom, after observation extending over several weeks, gave a favorable prognosis. This patient's vision has steadily improved and she is now between four and five months pregnant, is able to read, and has good ordinary vision. She is sensitive to direct and to bright light.

This and similar cases led the reviewer to make a hopeful prognosis in the ocular lesions which develop during the toxemia of gestation.

The Necessity for Medico-legal Regulation in Therapeutic Abortion. Richter¹ contributed a paper upon this subject before the Munich Gynecological Society, which elicited a prolonged discussion. The paper drew attention to the necessity for medico-legal regulation of the so-called therapeutic abortion, in the interests not only of the patient but of the profession. The coöperation of health authorities in these cases will only serve to strengthen and protect reputable men and prevent abuse by criminal abortion.

The discussion was interesting and brought out fully the points in question.

Eclampsia. **THE BLOOD PRESSURE INDEX OF ECLAMPSIA.** Bailey² publishes a very interesting and timely paper upon the significance of blood pressure in eclampsia.

Great importance has recently been ascribed to this phenomenon and dogmatic statements have been made to the effect that toxemic patients threatened with eclampsia always have a high blood pressure, and that this is our most reliable index of the degree of toxemia present and the threatening danger of eclampsia.

The writer has made 1136 systolic readings on 145 normal women in the latter months of pregnancy, and finds the average blood pressure 118 mm. of mercury. Examination of these readings showed that

¹ *Monatsschrift f. Geburtshülfe und Gynäkologie*, 1911, Band xxxiii, Heft 1.

² *Surgery, Gynecology, and Obstetrics*, November, 1911.

fluctuations amounting to 30 mm. of mercury often occur above this average and are of no real significance. The high limit rarely passed in pregnancy is 160 mm. Most patients have a continuously low blood pressure without apparent cause. No regular variation in the readings in primiparæ or multiparæ was observed; 28 per cent. of the patients examined showed a variation of 25 to 30 mm. during pregnancy.

In the first and second stages of labor, blood pressure of 140 to 150 mm., if taken between the pains, is considered a fair average.

In studying the toxemia of pregnancy, blood pressure was found in the early stages of the disease to be invariably low. In the early months of gestation, toxic substances apparently influence the vomiting centre, with but little action on the vasomotor apparatus. In the latter months, blood pressure in toxic patients seems to rise with an increase in the natural resisting power of the body. In the fulminant type of fetal toxemia in the latter months, blood pressure is very low, as the vasomotor system seems to be overwhelmed by the poison. In 2 fatal cases described, blood pressure varied from 70 to 80 mm.

In the presence of eclampsia, blood pressure may be as high as 200 mm., or as low as 155 mm.

As regards the treatment of toxemia, it should be entirely eliminative. With the elimination of toxins, blood pressure falls, and this fall may be an indication of the extent to which eliminating treatment should be carried. Even if convulsions ensue, efforts should rarely be made to lower the blood pressure, for patients with chronic nephritis and arteriosclerosis often have a pressure of 200 mm., and the arteries of pregnant women are rarely extensively diseased. When veratrum viride is given freely to check convulsions, collapse is produced, leaving the patient in a condition similar to cases of the fulminant type of toxemia. If nitroglycerin, and other drugs acting on the peripheral mechanism of the convulsions are used, the patient's natural resistance to toxins is reduced, and the index to the success of eliminative treatment is destroyed. It is possible that the nitrite group of drugs may be of value when the blood pressure is excessively high. When cases resist eliminative treatment, and blood pressure increases, the uterus should be emptied. Blood pressure examinations made three times weekly during the last month of gestation, combined with an examination of the urine, is, in the present stage of our knowledge, the best method of ascertaining the threatening danger of eclampsia.

Under the title *Shock in Eclampsia*, Bailey¹ contributes a paper drawing attention to the shock so often observed in eclamptic patients who were given veratrum viride. Spontaneous delivery occurs; or, when veratrum alone is given, or when rapid delivery is practised without the administration of veratrum, this also occurred.

¹ American Journal of Obstetrics, August, 1911.

The rapid emptying of the uterus in eclampsia frequently lessens blood pressure by 100 mm. of mercury, producing collapse or shock. Veratrum given freely may lessen blood pressure 140 mm. of mercury, with the same result.

When patients who have had veratrum viride are treated by rapid delivery, fatal shock is not infrequently seen. If it is thought best to lower blood pressure in a given case nitroglycerin and erythrol tetranitrate may be used. Blood pressure may be temporarily lowered either before or during labor by emptying the uterus.

Those who have had large experience with eclampsia have frequently been disappointed by the fatal termination of cases whose blood pressure had decreased, and who were apparently doing well. The most frequent cause of death in these patients is paralysis of the vasomotor system, pulmonary edema, or multiple gangrene, or embolic pneumonia.

The reviewer's experience leads him to believe that the important points in the treatment of a case of eclampsia are to encourage elimination and to anticipate and prevent, if possible, this vasomotor paralysis. We have seen the best results by abstaining from all methods of rapid delivery, and those methods of treatment which profoundly depress the circulation or cause profound changes in the circulation. Moderate blood-letting, with intravenous saline transfusion, irrigation of the stomach and intestine, calomel placed in the stomach through a stomach tube, continuous warmth to the skin by blankets, with free inhalation of oxygen, and the administration of moderate doses of strychnine, digitalin, and codein, hypodermically, have given the best results. Should labor develop, the blood pressure may temporarily be decreased by rupturing the membranes.

Anesthesia for delivery should be avoided if possible. The use of the detention sheet, covering the entire body of the patient, will do much to control restlessness and avoid the necessity for anesthesia.

It has still to be proved that immediate emptying of the uterus is the cardinal point in the treatment of toxemia and eclampsia.

IS ECLAMPSIA A PHENOMENON OF ANAPHYLAXIS? Felländer¹ found from his experimental studies of the subject that he was unable to increase the sensibility of guinea-pigs with placental extract, fetal serum, or the milk from the same animal. His attempts failed to demonstrate anaphylaxis in guinea-pigs, and materials obtained from these animals or the human subject had entirely negative results.

ECLAMPSIA WITHOUT CONVULSIONS AND WITHOUT UNCONSCIOUSNESS. Under this title, Schmid² reports the case of a patient admitted to the hospital with a history that she had been eight months pregnant, and several hours previously had given spontaneous birth to a viable living

¹ Zeitschrift f. Geburtshülfe und Gynäkologie, 1911, Band lxxviii, Heft 1.

² Ibid., Band lxi, Heft 1.

child. The mother had suffered from free hemorrhage, and the placenta was still in the uterus.

Upon examination, the patient was a large, apparently strong woman, but anemic. She was perfectly conscious, and there was but slight edema in both the lower extremities. The pulse was 132, compressible, the abdomen relaxed, and the uterus evidently contained the placenta; 200 c.c. of clear urine was removed by catheter, giving a positive reaction for albumin. An effort to express the placenta failed.

The patient was anesthetized with ether and the placenta readily removed by the hand, and entire. The uterus was irrigated by a hot douche, ergotin was given, and a perineal laceration repaired. The pulse was 120, weak, and salt solution was administered. When the patient recovered from the anesthetic she was restless, but responded to questions. Air hunger was present and the radial pulse could not be felt. Direct transfusion of blood was given from the mother of the patient for twenty minutes. In spite of this, the patient steadily failed, and died.

Autopsy showed hemorrhages into the substance of the liver, endocardium, the lungs, and the brain. The lesions were characteristic of eclampsia.

From this case, and the study of the literature, Schmid believes that eclampsia can be diagnosticated by the pathological changes found in various organs, and that convulsions and unconsciousness may be absent in a patient perishing from this disease.

Gussakow¹ reports 2 cases of patients dying in labor with what is termed "eclampsia without convulsions."

The first case was a multipara between the fifth and sixth months of pregnancy, sent to the hospital because she had hemorrhage and was threatened with abortion. Hemorrhage ceased when the patient was put in bed after admission. The patient was conscious and had no abnormal symptoms. During the night following, labor pains developed, the patient became very restless, with a rise of temperature and rapid pulse, and it was thought best to deliver the fetus and placenta. Coma followed with spasm of the right arm. There were also periodic cramp-like movements of the muscles of the eyes.

The patient died with pulmonary edema.

Autopsy showed edema of the meninges and lungs, parenchymatous degeneration of the liver, heart muscle, and kidneys.

His second case was a primipara, aged twenty-four years, previously healthy, who gave birth to a dead child in spontaneous labor. The placenta was speedily delivered and there was no hemorrhage. She soon afterward became unconscious and pulmonary edema developed, followed by death.

¹ Zentralblatt f. Gynäkologie, 1911, No. 21.

Upon autopsy, pulmonary edema was pronounced, and there was parenchymatous degeneration of the heart muscle and kidneys. The liver showed multiple acute hemorrhage.

These cases, like that reported by Schmid, had none of the symptoms of typical eclampsia.

A similar paper describing the pathological findings in 12 cases in Resinelli's clinic in Florence was contributed by Francesco.¹

THE PLACENTAL THEORY OF ECLAMPSIA. Frank and Heimann² made experiments to determine the action of a placental toxin as a possible cause of eclampsia, and the possible diagnostic test of pregnancy. The experiments were negative, and the literature of the subject is reviewed, showing the conflicting reports by various observers and the lack of definite knowledge upon the relation of the placenta to eclampsia.

FATTY ACIDS AS A CAUSE OF ECLAMPSIA. Mohr and Freund³ deny the results obtained by Polano and Graff, which showed that fatty acids and lipid substances from the placenta were causes tending to bring about eclampsia. They have repeated these experiments with an absolutely negative result.

An excellent review of the PATHOLOGY AND TREATMENT OF ECLAMPSIA is given by Huffel.⁴ As regards treatment there is a growing tendency to avoid the use of chloroform because of its injurious effect upon the liver. Hot packs, irrigation, occasional bleeding, and the free use of salt solution, are universally employed. Where it is desired to avoid in every way increasing the work of the heart the hot pack is avoided. If the kidneys are greatly damaged, salt solution must be used with caution.

Stragonow's good results with the use of narcotics only are noted. As especially valuable are the use of salt solution, the giving of digitalis, and the employment of heat. Stragonow has treated 330 cases of eclampsia with a mortality of 6.9 per cent.

Olshausen and others distinguish between mild and severe cases, and only empty the uterus promptly in the latter. *Veratrum viride* is praised by Mangiagelli and Mirto. Some have used parathyreoidin and others thyroid extract. In Germany, these substances have not given good results. Sellheim injected iodide of potassium into the mammary glands with good results, and Gutbrodt gave iodide of potassium during pregnancy to toxemic patients with advantage. Hirudin, or the extract of leech, has given good results in the hands of some observers.

Observers agree that when labor begins and is prolonged that assist-

¹ *Annali di Ostetricia*, 1911, No. 4.

² *Surgery, Gynecology, and Obstetrics*, May, 1911.

³ *Monatsschrift f. Geburtshülfe und Gynäkologie*, 1911, Band xxxiii, Heft 6.

⁴ *Ibid.*, Heft 2.

ance should be given and labor terminated. The use of dilating bags is advised for private cases in the hands of the general practitioner. In hospital practice, vaginal Cesarean section has given good results, the mortality being as low as 6.5 per cent. The fetal mortality is also reduced one-third. The majority of observers report a lessened mortality with vaginal Cesarean section.

Decapsulation of the kidney has been given an extensive trial in Germany, and while some report good results others are opposed to the operation.

In the *Zentralblatt f. Gynäkologie*, 1911, No. 49, Jarzew, of Moscow, draws attention to the importance of albuminoid bodies which are not digested by the liver in producing toxins which bring about eclampsia. Globulin, he believes of special importance, as it increases greatly the fibrin percentage of the blood. The increase in arterial tension he believes to be an essential condition.

THE TREATMENT OF ECLAMPSIA BY THE INTRAVENOUS INJECTION OF HIRUDIN. Engelmann¹ reports 14 cases of eclampsia treated by the intravenous use of hirudin. He used from 2 to 3 decigrams of hirudin in Ringer's solution or salt solution. This was usually employed when other methods had failed, and any benefit which followed this treatment is ascribed to hirudin. Some cases were treated by delivery, and in others the uterus was not emptied; bleeding was practised in some and not in others; and each case was treated as indications suggested with the use of hirudin as oftentimes a last resort.

The writer thinks that in this manner the comparative effects of this remedy are better demonstrated. These cases had many convulsions, and were, in comparison with others, severe cases. In this series there were 5 fatal cases, in one of which autopsy showed extensive changes in the liver, kidneys, and heart muscle; in the second, double croupous pneumonia; in the third, cerebral hemorrhage; in the fourth, extensive lesions in the liver with dilatation of the right heart, and alteration in the kidneys; the fifth case died from chronic nephritis.

In postpartum eclampsia, the results were good.

Lichtenstein² reports the results of 400 cases of eclampsia in Zweifel's clinic in Leipsic.

He observed that convulsions ceased after the prompt emptying of the uterus in but one-fourth of the cases. If all cases of eclampsia were included, convulsions ceased in but one-third.

The mortality of eclampsia after the uterus is emptied is remarkably high, and the mortality of premature labor is not essentially better than that of rapid delivery. If the general mortality of a large series of cases be taken, neither premature labor nor rapid delivery at term

¹ Zeitschrift f. Geburtshülfe und Gynäkologie, 1911, Band lxxviii, Heft 3.

² Archiv f. Gynäkologie, 1911, Band xev, Heft 1.

shows any essential advantage. The essential element in those patients treated by delivery consists in the loss of blood. In cases in which convulsions develop after the uterus is emptied, spontaneous birth has taken place in 90 per cent., and these cases show the least blood loss. The average hemorrhage in eclampsia is 500 c.c., which is from 100 to 150 c.c. more than the average blood loss in labor. In 40 per cent. of those patients operated upon, the hemorrhage exceeded 500 c.c., while in those patients delivered spontaneously there was no excess of hemorrhage.

Taking the average loss of blood in spontaneous labor as 350 to 400 c.c., 52 per cent. of the cases of eclampsia treated by operation exceeded this; while but 4 per cent. delivered spontaneously had more than the average bleeding. Those patients in whom convulsions ceased after delivery lost 50 per cent. more blood than those in whom the convulsions had not ceased, and four times as much blood as those in whom convulsions first appeared during the puerperal period.

One is led from these facts to consider the essential element in the result produced by premature labor and rapid delivery, as not in the removal of the fetus from the uterus, but in the loss of blood. Recognizing a toxic condition of the blood as an essential factor in producing eclampsia, bleeding seems indicated in those patients in whom convulsions developed after delivery, because they lose less blood in labor; and also in those cases in which convulsions or coma do not cease after the uterus is empty.

Curetting of the puerperal uterus after eclampsia has practically the effect of an intra-uterine hemorrhage. So far as the treatment of eclampsia is concerned, bleeding is preferable to this procedure. Bleeding may be practiced to advantage in severe cases of eclampsia before the uterus is empty.

It is evident that all cases of eclampsia should not be treated by immediate delivery, because in some cases the patient recovers from the eclampsia and goes on to a normal termination of pregnancy, with the birth of a living child.

While the old statistics of the results of premature labor and rapid delivery favor the placental theory of eclampsia, the most recent statistics are not in favor of this theory, but rather against it. The fact that eclampsia may cease without interrupting pregnancy is also against the theory that eclampsia is produced by the ovum or its appendages. It cannot be alleged that the birth of the fetus causes the convulsions to cease, because in many cases they cease without fetal death, and in others eclampsia does not develop until the fetus has died, and perhaps macerated.

The average number of convulsions in a large series of cases of eclampsia is eight in each case, and Seitz has noted that cases that have mental disturbance after eclampsia are those who have had two

or three times the average number of convulsions. In 50 cases coming to autopsy, the pelvis of the kidney and ureter were dilated in 30 per cent., and in 27 cases in whom autopsy was performed immediately after death, this phenomenon was present in $33\frac{1}{3}$ per cent.

The value of *veratrum viride* in eclampsia is emphasized by Zinke.¹ He is in favor of the immediate emptying of the uterus, but relies principally upon *veratrum* and continues its use for some time after the recovery of the patient from eclampsia. He uses, in many cases, chloral by rectum, free but not excessive catharsis, hot packs, and hot baths. He believes that the antitoxin treatment may prove of decided value.

ECLAMPSIA COMPLICATING LABOR IN A GIRL, AGED TWELVE YEARS, WITH RECOVERY. Roberts² reports the case of a Jewish schoolgirl, aged twelve years, admitted to Queen Charlotte's Hospital in labor.

The patient was very pale, with edema of both legs. She was excited and uncontrollable; the urine highly albuminous. The pelvis was not deformed, but the patient had a purulent vaginal discharge. Eclamptic convulsions developed, and the patient was treated by morphine, chloral, and bromides. The skin reacted poorly to the hot pack. Saline solution was given by the bowel.

When the cervix was fully dilated, the forceps was applied under chloroform, and a male living child delivered without difficulty. The patient lost about 18 ounces of blood after the delivery of the child. A pint of warm salt solution was injected under the breast. In all, labor lasted sixty-nine hours and fifteen minutes. Severe convulsions recurred after delivery, followed by coma and an excessively feeble pulse. The secretion of urine practically ceased, the patient's temperature rose to 105° F., her pulse from 130 to 150. In all, the patient had twelve convulsions. She gradually recovered, and left the hospital on the twenty-fourth day, apparently well. The child did well on artificial feeding.

THE TREATMENT OF ECLAMPSIA BY AMPUTATION OF THE BREASTS. Herrenschnneider³ reports the case of a patient, aged eighteen years, pregnant for the first time, who was brought into the hospital unconscious, having severely bitten her tongue. She has had two severe eclamptic convulsions. The limbs were edematous, the breathing excessively harsh and snoring. The pelvis was contracted, and there was but little dilatation of the cervix. The urine contained albumin and casts, and the patient was treated by a hot pack, and an enema of chloral. No improvement followed, but the convulsions continued, and abdominal Cesarean section was performed, with the delivery of

¹ American Journal of Obstetrics, February, 1911.

² British Medical Journal, October 21, 1911.

³ Zentralblatt f. Gynäkologie, 1911, No. 18.

a living child. There was but little hemorrhage. The convulsions occurred after delivery, being severe and frequent, and the patient was apparently moribund.

Both breasts were then amputated under very slight anesthesia, after which the convulsions completely ceased. The patient remained in a condition of coma, with great restlessness, for forty-eight hours after, and developed a severe cough, difficult breathing, and foul expectoration. Right lobar pneumonia developed. The patient became partially conscious, and took nourishment freely. She then passed into a condition of mania with hallucinations, and in a violent fit of coughing burst the abdominal wound and forced out a considerable portion of the intestine. This was replaced and compresses were applied, and the abdominal wound drained. Peritonitis did not develop. The patient passed gas from the bowel, and began to recover. The abdominal wound slowly healed by secondary union. For some time after, the patient expectorated a large quantity of very foul matter, evidently the bursting of a pulmonary abscess. The patient ultimately made a complete recovery.

At the time of the patient's admission to the hospital, her pulse tension was 160 mm. of mercury. Just before amputation of the breasts it rose to 180 and 190. Twenty minutes after the removal of the breasts the pulse tension was from 110 to 115 mm. After this operation it did not exceed 130 to 135 mm.

RENAL DECAPSULATION IN ECLAMPSIA. Ehrenfest¹ performed experiments on seven dogs in decapsulating the kidneys. He found that the immediate effect of decapsulation was a temporary suppression of the secretory function in the operative kidney and a distinct retardation of diuresis in the other kidney, at times amounting to complete anuria. This reflex effect is also exerted in a kidney decapsulated forty-eight hours previously, but to a less degree. From twenty-four to forty-eight hours after the operation, the decapsulated kidney shows approximately the same power of secretion as a kidney which has not been decapsulated in the same animal.

A SUCCESSFUL CASE OF DECAPSULATION OF THE KIDNEY FOR ECLAMPSIA. Reinhardt² reports the case of a primipara who gave spontaneous birth to a living child at full term. Soon after, severe convulsions began, with unconsciousness, cyanosis, and harsh breathing. The urine contained blood and albumin.

Both kidneys were decapsulated, and both were found enlarged, dark bluish red, and tense. There was little bleeding during the operation, and the kidneys were drained with strips of iodoform gauze. The patient had four convulsions after the operation, but gradually im-

¹ Surgery, Gynecology, and Obstetrics, September, 1911.

² Zentralblatt f. Gynäkologie 1911, No. 3.

proved, and the albumin disappeared in four days. Both wounds failed to heal by primary union, and were opened to permit the discharge of secretions, and allowed to heal by granulation.

Littauer¹ reports 2 successful cases of decapsulation of the kidney for eclampsia. The first was in the seventh month of pregnancy and suddenly taken with convulsions. There were no uterine contractions on admission to the hospital, the child was living, and the urine highly albuminous.

Vaginal Cesarean section was performed, with profuse hemorrhage from the cervix. The child was delivered by forceps and died on the following day. Coma persisted, and convulsions recurred which became very severe. There was complete suppression of urine, and decapsulation of the kidneys was performed. The left kidney was larger and more tense than the right. The secretion of urine soon returned, and the patient gradually improved and made a good recovery.

The second case was a primipara in the beginning of labor, taken with severe convulsions. On admission to the hospital, the cervix was nearly dilated and the feet presenting, so that the child was readily delivered. The pregnancy proved to be twins, both of whom were born alive. Convulsions ceased for some time after labor, but then returned with great severity. The secretion of urine was very scanty.

Both kidneys were decapsulated, and in the right it was not necessary to incise the capsule, as the manipulation necessary to deliver the kidney seemed to loosen it from the substance of the gland.

The patient improved, with an abundant secretion of urine, the albumin disappearing on the fourth day after the operation.

VAGINAL CESAREAN SECTION IN THE TREATMENT OF ECLAMPSIA. Peterson² has collected 530 cases of eclampsia treated by vaginal Cesarean section. The maternal mortality was 23.4 per cent.

In general, statistics indicate that immediate delivery has a lower mortality than methods of treatment by which prompt delivery is not practised. While convulsions ceased in more than half of these cases after operation, 18 per cent. of these patients perished. The maternal mortality, in eclampsia after vaginal Cesarean section, increases with the increase in the number of convulsions preceding the operation. Up to ten convulsions there is no particular regularity with the maternal mortality of eclampsia when the uterus is emptied by vaginal Cesarean section. Beginning with the operations performed after ten convulsions, the mortality increases rapidly. The average number of convulsions in the 530 cases collected was eight, and the fatal cases had a higher average than those that recovered. Multiple pregnancy seems to be a cause of eclampsia.

¹ Zentralblatt f. Gynäkologie, 1911, No. 33.

² American Journal of Obstetrics, July, 1911.

When premature children weighing less than 2000 grams were excluded, the fetal mortality after vaginal Cesarean section for eclampsia was 21.2 per cent. in 315 children. The fetal mortality in eclampsia is lower after spontaneous than after operative delivery, but not so low as after vaginal Cesarean section. The greater the number of eclamptic convulsions before delivery, the higher the fetal mortality. The fetal mortality is also higher in multiparæ than in primiparæ.

Although eclampsia is more common in primiparæ, the maternal mortality is higher in multiparæ. Deep coma is an unfavorable symptom, and at least 35 per cent. of patients having this phenomenon perish. The more operative interference in a case of eclampsia before delivery is effected, the greater is the mortality.

A study of the operation shows that the fetal mortality is less when only the anterior uterine wall is incised. This incision seems ample for all purposes of operation. The percentage of complications is lower after the anterior incision only is practised.

After the uterus has been opened by vaginal section, the use of forceps has a lower mortality than delivery by version, and the best results are obtained for the mother by forceps in the ninth and tenth month of gestation, but for the child by version. Delivery is somewhat more readily accomplished when both the anterior and posterior cervical lips are incised. The aftercoming head is sometimes extracted with difficulty, and tears of the uterus and soft parts are more frequent after version than after forceps.

In 169 of the 530 cases, there was no hemorrhage. In 26, there was bleeding from the incision; in 1, profuse bleeding from a tear in the uterus, necessitating vaginal hysterectomy; there was postpartum hemorrhage in 61 cases, 3 of which were profuse, 2 severe, and 1 considerable; in 13 cases, the uterus was packed with gauze; in 72 cases there was hemorrhage, but it was not stated whether it was from the incision or postpartum from the uterus.

In 408 cases of which a record was kept, catgut was used as suture material in 373 cases. There was no detailed record concerning the frequency of septic infection. Fever was recorded in 48 cases, with 42 recoveries and 6 deaths. The mortality from sepsis is estimated as 4.4 per cent., but this is probably not a strictly accurate estimate.

Abdominal Cesarean section for eclampsia, in 182 cases, has given a maternal mortality of 53.8 per cent., and a fetal mortality of 19.5 per cent.

DECAPSULATION OF THE KIDNEYS FOR ECLAMPSIA. Longard¹ believes that there are three important factors in all severe cases of eclampsia. The first is the sudden development of poison, organic in nature, probably produced by anaphylaxis and causing frequent toxemia.

¹ Monatsschrift f. Geburtshülfe und Gynäkologie, 1911, Band xxxiv, Heft 4.

The second is an acute inflammatory process in the parenchyma of the kidneys. The third is sudden increase in the blood tension in the kidney substance, which produces anemia of these organs.

When the uterus has been emptied and convulsions continue without increase in the secretion of urine, or diminution in albuminuria, he would perform decapsulation. He has performed 10 operations, and 1 was done in his hospital service during his absence. This case was of unusual interest, for it was found that the patient possessed but one kidney. Operation was done twelve hours after the uterus had been emptied, the patient dying three hours later.

One patient died twelve days after operation of septic infection, having become maniacal, tearing the bandages and infecting the wound. The second case died on the fifth day with septic infection, autopsy showing that the infection had its origin in the uterus. Another case died from hemorrhagic nephritis with complete suppression of urine.

As these patients are usually very restless and often in convulsions, anesthesia is necessary. Ether was used without apparent injury. Operation should be done as quickly as possible, twenty to twenty-five minutes being usually sufficient. The capsule should be severed through its entire length, stripped back by pieces of gauze, and the kidney replaced. The wounds may be drained if it is thought necessary.

THE PATHOLOGY AND TREATMENT OF PUERPERAL ECLAMPSIA is the subject of an extensive paper by Barr and Commandeur.¹

They find that the studies of the last fifteen years have failed to identify the precise cause for eclampsia. The treatment must be addressed to symptoms based upon experience, and is most successful when prophylactic. Progress has been made in surgical treatment by improving the technique of vaginal Cesarean section, and by introducing decapsulation in cases of anuria.

So far as the medical treatment is concerned, the revival of blood-letting had been a most important feature. We do not yet know the precise value of thyroid or parathyroid extract or of the various sera. The excessive use of salt solution is dangerous, as it increases the blood pressure, and a solution of sugar does not seem of great value. Lumbar puncture has not been proved of importance, but may be useful in cases showing symptoms of cerebrospinal meningitis.

So far as the obstetrical treatment is concerned, it cannot be proved that the rapid emptying of the uterus is always indicated. Vaginal Cesarean section is a serious operation, and may be complicated by wounds of the bladder and by postpartum hemorrhage. It is indicated in some cases of great rigidity of the cervix, or where abdominal section cannot well be performed. Decapsulation of the kidneys is principally indicated after the uterus has been emptied, and only where there is almost total or entire cessation of the secretion of urine.

¹ L'Obstétrique, 1911, Nos. 11 and 12.

An exceedingly reserved opinion must at present be held regarding the value of the removal of the mammary glands.

CHARACTERISTIC CHANGES IN THE LIVER IN ECLAMPSIA, WITH CLINICAL SYMPTOMS. Heinrichsdorff¹ reports the case of a patient, aged twenty-two years, in her first pregnancy, who had been two months in the hospital before labor with not the slightest symptom of ill health.

The urine contained no albumin or casts.

After the patient had been twelve hours in labor, she was delivered by forceps because the child's life was threatened. Shortly after delivery a profuse hemorrhage occurred, followed by death half an hour later, apparently from heart failure.

At autopsy, the heart muscle seemed to be flabby, reddish yellow in color, not hypertrophied; the valves were normal. The kidneys were very slightly enlarged, and presented the phenomenon of congestion.

Microscopic examination showed necrosis of the epithelia. The uterus was flabby, and contained blood clots. The liver was enlarged, with extravasation of blood beneath the capsule, its color dark reddish-brown, and more firm than normal. The characteristic changes of parenchymatous hemorrhage and cirrhosis were present.

The Metabolism of Development. Under this title, Murlin publishes the results of some very interesting studies in the *American Journal of Physiology*, 1910, vol. xxvi, p. 134; vol. xxviii, p. 422.

He finds that in the pregnant dog the increasing energy production due to pregnancy was not evident until the sixth week of gestation. Between the sixth and eighth weeks, 9 per cent. increase was observed. The total energy production due to pregnancy was proportional to the weight of the offspring at birth. The extra energy production near the end of pregnancy is nearly equal to the energy requirement of the newborn. Both mother and child show marked energy production in the first few weeks after birth.

The effect of menstruation is to cause a retention of nitrogen, probably as compensation for blood loss. During the first half of normal pregnancy there is nitrogen loss, probably due to enzymes not yet limited by the placenta. In the last half of pregnancy there is nitrogen retention.

In normal pregnancies, the departure from normal standards of nitrogen and sulphur are caused by protein retention. Thus low urea nitrogen, or low urea and ammonia nitrogen, are caused by the fact that the nitrogen ordinarily eliminated as ammonia or urea is resynthesized in the intestinal wall to make good the depletion of the blood proteins caused by the growing ovum and its appendages. As a result, creatinin, uric acid, and undetermined nitrogen increase, so do inorganic sulphate sulphur and neutral sulphur.

¹ Zentralblatt f. Gynäkologie, 1912, No. 4.

Placenta Prævia. EXPULSION OF THE PLACENTA BEFORE THE BIRTH OF THE CHILD. Macfarlane¹ reports the case of a multipara who had chronic endometritis. This was much improved by treatment, and pregnancy followed. The patient remained in good general health until the thirty-sixth week, when severe pain developed followed by sudden and profuse discharge of water, with the protrusion of a mass from the vagina.

Upon examining the patient, the placenta was found lying on the bed. There was no vaginal bleeding and the head of the child was filling a half-dilated cervix. Two and a half hours after the birth of the placenta, the child was spontaneously delivered. Polyhydramnios had evidently been present.

Upon examining the placenta, its length measured $11\frac{3}{4}$ inches, its thickness not above half an inch. Around the margin on the maternal surface were white infarcts, and these were present to some extent throughout the entire placenta.

The second case was that of a multipara who had chronic endometritis. Under treatment she greatly improved, and passed through a normal pregnancy to the twenty-eighth week, when labor came on, with the discharge of a great quantity of amniotic liquid.

Upon examination, the placenta was found presenting at the vulva. Three and a half hours after its expulsion her child, which had evidently been dead for some days, was expelled. There was no bleeding. The placenta contained numerous small red infarcts.

The third case was a multipara who had had two normal labors, followed by abortion and curetting. The following pregnancy was interrupted at the end of the sixth month for bleeding from marginal insertion of the placenta. The uterus was again curetted, and microscopic examination of the scrapings showed simple adenoma. After prolonged treatment the patient became better, and pregnancy again occurred. At the thirty-second week, labor began with early rupture of the membranes, and, when the patient was seen, the placenta had already been expelled. Labor terminated spontaneously three hours afterward. The placenta showed numerous white infarcts and three comparatively recent hemorrhages into its substance.

Treatment of Placenta Prævia. Schweitzer² reports the results of the treatment of 100 cases of placenta prævia in Zweifel's clinic at Leipsic, among 5603 cases of labor. The age of the patients varied from twenty-one to forty-six years. There were 12 primiparæ, 20 in the second pregnancy, and 68 multiparæ; 8 patients had suffered from abortion, 6 in previous labor had manual removal of the placenta, and 3 had previously had placenta prævia.

¹ Journal of Obstetrics and Gynecology of the British Empire, August, 1911.

² Archiv f. Gynäkologie, 1911, Band xciv, Heft 3.

Of the 100 cases, 35 were total placenta prævia and 65 partial placenta prævia.

Six of the mothers died, one of whom was in advanced tuberculosis. This patient had been operated upon for tuberculosis of the spinal column, and had suppuration in the right thigh. She had also myocarditis. The elastic bag was introduced through the placenta, which was central, and ten hours later the child was delivered alive by version and extraction. The mother did not long survive.

If this case is excluded as inevitably lost, the maternal mortality was 5.05 per cent. Of these women, 4 died from hemorrhage, and 1 from septic infection.

One of these patients was admitted pulseless to the hospital, having had two hemorrhages, one fourteen and the other eight days before admission. She had been under the observation of a physician for fifteen hours, who had done nothing for her.

As dilatation was almost complete, the placenta was pierced and a foot brought down, which promptly checked the bleeding. Soon after, a dead child was spontaneously expelled, followed by the placenta. Momburg's bandage was applied with apparent good results, and the uterus tamponed. When the bandage was loosened later, the patient collapsed and died.

Autopsy showed no lacerations of the genital tract, but universal anemia.

In 2 other cases there was severe hemorrhage, following delivery, from extensive tears in the cervix. In 1 of them, a living child was delivered by version and the cervical tear closed as soon as possible. In spite of this and the use of the tampon, the bleeding persisted to a fatal issue.

In the second case, version was performed with extraction within an hour, causing laceration of the cervix. This was closed. Although the patient's hemorrhage was controlled, she died of acute anemia soon after.

The fourth case dying of hemorrhage was one of central placenta prævia treated by the introduction of a bag within the cavity of the ovum. The bag was expelled, and version was then performed with very gradual extraction of the child, which was premature and dead. The placenta was expelled spontaneously, but the uterus contracted badly. The hemorrhage persisted in spite of tamponing, compression of the aorta, and the use of Momburg's bandage. The patient died of acute anemia.

The case dying of sepsis was a multipara who had severe hemorrhage and fever before admission. She had suffered from a purulent discharge for a year previously. Eight days before admission she had very severe hemorrhage. A full-term child was delivered alive by version and extraction, followed immediately by the placenta. Post-

partum hemorrhage, in spite of the tampon, was considerable. The patient died thirty-eight days after delivery from pyemia.

In these fatal cases, podalic version and extraction were practised three times, the use of the bag only once, and combined version once. In all of these cases there had been repeated blood loss during pregnancy. Unquestionably, this greatly diminishes the patient's chances for recovery.

In 35 cases of total placenta prævia, hemorrhage occurred during pregnancy in 20, premature labor with bleeding in 7, and hemorrhage during labor in 8; 19 went to full term, making 54.3 per cent.

In the partial placenta prævia's, 65 in number, there was hemorrhage during pregnancy in 65, premature labor and hemorrhage in 16, postpartum bleeding in 23; 41.5 per cent. of these went to full term.

In the cases of total placenta prævia, 35 in number, there were severe lacerations of the cervix in 8, and 4 of these had hemorrhage during pregnancy. In 65 cases of partial placenta prævia, there were severe lacerations of the cervix in 10, of whom 4 had hemorrhage during pregnancy.

The mortality rate of 12 other clinics is given, and found to range from 5.3 per cent. to 10 per cent. Thus the mortality in Zweifel's clinic, 5 per cent., is not above the average. The morbidity of placenta prævia can be estimated from the 94 patients who recovered; 70 of these had a puerperal period without fever; 16 had fever for several days; 8 had but one rise of temperature; 25.5 per cent. of these patients had fever. In 20 who were not examined by a physician or midwife before admission, 20 per cent. had fever; and of 74 who were examined, 25.7 per cent. Of those who were simply examined before admission, 24.4 per cent. had fever or other complications. Of those who were tamponed before admission, 25 per cent. had complications, and those in whom some method of operation had been attempted before admission, 40 per cent. had complications. In 52, the patients were discharged in fair condition in from seven to nine days after labor. One patient remained in the hospital ninety-eight days after delivery. She suffered from sepsis with thrombophlebitis, pleurisy, and pulmonary embolism.

Of the 100 patients, 104 children were born, there being 2 cases of twins; 64.5 per cent. were born living, of whom 17 died before the mother left the clinic; 35.5 per cent. were stillborn, of whom 22 were viable, 15 not viable; 48 per cent. of the children were discharged in fairly good condition.

An examination of the results in those children that were viable show that 63.3 per cent. were discharged from the clinic living. The mortality of the children in total placenta prævia was 45.7 per cent.; in partial placenta prævia, 28.9 per cent.

In analyzing the various methods of treatment employed, combined version was practised in 30 cases, and in none of these was more than

one quart of blood lost. In 8 of these patients, there was considerable laceration of the cervix.

The mortality of combined version was 3.3 per cent., the morbidity, 31 per cent. The average time in the hospital was 10.2 days. Combined version had a fetal mortality of 68.8 per cent., and as 6 children died later the entire mortality following this operation for the fetus was 87.5 per cent.

The intra-amnial use of the dilating bag was practised in 39 cases, of which 19 were total placenta prævia, and 20 partial placenta prævia. When the membranes could not be reached the placenta was pierced, and the bag inserted through the placenta and a weight of 2 pounds attached to its tube. The bag seemed efficient in checking the hemorrhage, but in 3 cases extensive cervical lacerations resulted. The period during which the bags remained and exercised pressure varied from one to ten hours, and in 2 cases, even this was exceeded. Among most of the patients, dilatation was practically complete in six hours. If dilatation was not satisfactory at the end of that time, the bag was changed. To avoid infection, it was thought safer not to proceed longer than this with the use of bags, but if possible to perform combined version. In 3 cases where the bags remained longer than eight hours, fever developed in 1. In 5 cases in which the bag was used, the descent of the head checked the hemorrhage; but in 34 cases it was necessary to proceed to internal version and extraction. The blood loss with the use of the bags was double that observed after combined version. In 4 patients there was severe relaxation of the uterus, and in 6 cases the uterus was somewhat atonic.

The maternal mortality with the use of bags was 2.6 per cent.; the morbidity, 24.3 per cent.; the average time of discharge from the hospital was 11.3 days.

Among the children in these cases, where bags were used, the primary mortality was 12.2 per cent., and as 6 of these children died a little later, before leaving the hospital the fetal mortality rose to 26.8 per cent.

Rupture of the membranes only was employed in 5 cases of partial placenta prævia with vertex presentation. This had no maternal mortality and little blood was lost. There was no mortality for the children at the time of delivery, but as some died soon after the fetal mortality rose to 25 per cent.

This simple method has a very narrow field of usefulness, but is valuable in that. It is thought that combined version, so far as the mother's interests are concerned, is the most available and successful treatment for placenta prævia. The loss of fetal life, however, is very great because the child is not immediately delivered; but if delivery follows version the mother is in danger from lacerations of the cervix and hemorrhage.

The use of bags gives a better result for the child, but exposes the

mothers to increased danger because of the increased frequency of manipulation. The use of the bag cannot be considered as so brilliantly successful as some would have us believe.

Abdominal Cesarean section, subperitoneal, was done in one case between the eighth and ninth months of pregnancy. There were no uterine contractions, the patient was anemic, and in shock, the cervix partly dilated, and a bag was inserted to check the hemorrhage. Operation was performed by Latzko's method, with a favorable result for mother and child. There was remarkably little hemorrhage during operation. Vaginal Cesarean section was not performed, as it was not thought suitable for these cases.

In reviewing the results of treatment which can be carried out in the hospital, there is no question regarding the value of Cesarean section, with the patient in good condition with a partly dilated cervix, and when the patient is seen after the first severe hemorrhage. In general, when patients are seen in the second half of pregnancy, with bleeding from placenta prævia, pregnancy must be terminated as soon as possible. When the placenta is partial, rupture of the membranes may be useful. When the circumstances are not favorable for this, combined version or the use of the bag is indicated, and, if dilatation be present, internal version with the bringing down of a foot. The use of the bag is permissible when mother and child are in good condition. Combined version is indicated when the mother is in a very weak condition and the child dead or likely to die. When the cervix is undilated, the child living, the bleeding threatening, pains absent, and aseptic precautions can be instituted, Cesarean section is the operation of choice. If there is reason to fear that the patient is already infected, combined version, and, if necessary, perforation of the child, may be useful. When the patient is seen by a general practitioner in a private house, and cannot be brought to the hospital, combined version should be practised without extraction; but the physician should wait for the spontaneous expulsion of the fetus. If the patient can be brought to the hospital, the vagina may be tamponed by gauze, or with an elastic bag before the patient is placed in an ambulance. As postpartum bleeding is exceedingly dangerous in these cases, the gauze used for tampons should be saturated in alcohol or in a solution of alum. In uncontrollable bleeding, extirpation of the uterus may be practised in the hospital.

PLACENTA PRÆVIA TREATED DURING LABOR BY ABDOMINAL SECTION. Scipiades¹ reports 3 cases of delivery in placenta prævia by abdominal section. The first was a primipara, aged thirty-five years, at full term, suddenly taken with profuse hemorrhage. The os was closed, the cervix present, hemorrhage had ceased, and the patient

¹ Zentralblatt f. Gynäkologie, 1911, No. 41.

was kept for five days under observation. There was very slight oozing for the first two days, then none. On the fifth day, uterine contraction and hemorrhage began. When dilatation was slightly advanced, the hemorrhage ceased, but five and a half hours afterward became severe. To check it, an elastic bag was placed in the vagina. The patient was delivered by section of a living child, the placenta removed, and the uterus tamponed with gauze. The patient developed mastitis in the right side which gave her moderate fever, but which readily yielded to incision and treatment. She had a mild infection of the left breast, but made a complete recovery with her child.

The second case was that of a primipara, aged thirty-eight years, who had had an operation. Six weeks before admission she had hemorrhage repeated, and just before coming to the hospital a third hemorrhage. Upon admission, she was very pale, at full term, the fetus living, a faint placental souffle heard low down in the abdomen, and the cervix undilated. The patient seemed imperfectly developed. As she earnestly desired a living child she was delivered by section, and mother and child made a good recovery.

The third case was a multipara, aged forty years, who four days before admission had sudden profuse bleeding. Her physician applied a tampon, and sent her to the hospital. On admission, her pulse was from 130 to 140, and the fetus was dead. The cervix was present, the os slightly dilated only.

In the interests of the mother, supravaginal hysterectomy was performed, the patient being in a very critical condition and practically pulseless. At the end of the operation, stimulants being freely used with hypodermoclysis, the patient's pulse became plainly perceptible. She reacted well and left the hospital in good condition twenty days afterward.

The reviewer recently had an experience resembling that of Scipiades in his last case. A multipara had several severe hemorrhages, which ceased upon lying down. Her physician sent her to the hospital, after making repeated examinations, but without applying the tampon. Upon admission, bleeding had ceased, the os was partly dilated, the cervix resisting, the heart sounds could be plainly heard, and the patient was near term. Restoratives were given and as there was no bleeding it was determined to wait for a short time with the hope that the patient's condition would improve. Preparations for operation were immediately instituted. While this was being done another severe hemorrhage suddenly occurred, and operation was at once performed, the patient becoming pulseless during this time. The child was delivered living but died shortly after, being profoundly anemic.

The internal organs of the mother were almost bloodless. The operation was performed with the utmost speed, the uterus packed

with gauze, and the vagina firmly packed. Intravenous saline transfusion was performed during operation. Afterward the patient was placed in the exaggerated Trendelenberg posture, before a bright open fire, as the night was cold. She rallied steadily and has made a good recovery.

THE MORTALITY OF PLACENTA PRÆVIA. Unterberger¹ has examined the statistics of the province of Mecklenburg-Schwerin to determine the mortality of placenta prævia.

He finds records of 421,379 births in twenty-three years. On the average, 40.5 cases of placenta prævia each year occurred in this province. In this time, 99 patients died of hemorrhage from placenta prævia; 8 had spontaneous labor, 1 had premature rupture of the membranes; in 28 cases the tampon was first applied; 51 were treated by version; 2 by forceps; 1 by extraction; 5 died undelivered; and in 3, the method of treatment was unknown.

The physicians who attended these cases reported lacerations of the cervix in 4, but this complication must have been more frequent. Most of the patients were multiparæ; 50 of the 99 cases were in towns or villages where physicians could be obtained, and 49 were in the country where physicians were not at hand. The mortality is greater in the country than in town, when the comparative proportion is considered. The mortality of parturition in this province is estimated at 10 per cent. from hemorrhage from placenta prævia.

If cases of septic infection in placenta prævia who died later are considered, the mortality must have been much higher.

It is evident that these cases should be sent to the hospital at the earliest possible moment. In the Rostock clinic, the use of the bag in many cases has given good results for mother and child. In central placenta prævia, delivery by section is thought indicated.

THE ETIOLOGY OF PLACENTA PRÆVIA. Hoehne² has studied the etiology of placenta prævia, and places considerable importance upon the ciliated epithelia of the lining of the uterus. He believes that when there is abnormality in the development of the ciliæ that a tendency to abnormal attachment of the ovum exists. During menstruation this phenomenon is practically absent, reappearing after menstruation. In cases of chronic endometritis there is abnormal development of the ciliæ and also in profuse and excessive menstruation, myomas of the uterus, prolonged hemorrhage after abortion, and the hemorrhage which precedes the menopause. In atrophy of the mucous membrane of the uterus, the ciliæ disappear. It is evident that in cases in which they are abnormally present and active, the nidation of the ovum may

¹ Monatschrift f. Geburtshülfe und Gynäkologie, 1911, Band xxxiii, Heft 3.

² Zentralblatt f. Gynäkologie, 1911, No. 9.

be interfered with and that it may attach itself to the lowest portion of the uterus. In the latter instance, placenta prævia would develop.

THE USE OF THE ELASTIC BAG IN THE TREATMENT OF PLACENTA PRÆVIA OUTSIDE OF HOSPITAL. Fütth¹ has treated 16 cases in private practice outside of the hospital, and among these has used the elastic bag nine times without penetrating the cavity of the ovum, with good results for the mother. In one case, he attempted to introduce the bag through a central placenta prævia, and as he had no long forceps with him he penetrated the placenta with the finger, but could not rupture the amnion, and was obliged to use the bag in that manner. He believes that the intra-ovular insertion of the bag may be difficult, especially in cases not in the hospital.

THE TREATMENT OF PLACENTA PRÆVIA AT THE SLOANE HOSPITAL FOR WOMEN. Cragin² reports 49 cases of placenta prævia in 5000 deliveries at the Sloane Hospital for Women. These were treated by the writer and his assistants.

The treatment consisted of *dilatation of the cervix and control of the hemorrhage with the largest Voorhees bag* which could be introduced—No. 3 or No. 4. After the largest bag had passed the cervix and good dilatation was obtained, version was done, with breech delivery; or, if placenta prævia was lateral or marginal, with slight hemorrhage, the vertex presenting, the membranes were ruptured and the head was allowed to come down and exert pressure upon the lower uterine segment and the edge of the placenta, the delivery being expedited by the forceps if necessary.

The use of the bag was extra-ovular, and the membranes kept intact until the bag passed the cervix and good dilatation was obtained. Cragin prefers this method to the intra-ovular use of the bag, chiefly in the interests of the child, with little if any detriment to the interests of the mother.

If the membranes are ruptured and the dilating bag passed within the amniotic sac, the version which follows has to be performed in a uterus largely empty of fluid, and with greater danger to the child and greater danger of rupture of the uterus. His experience has shown that the presence of the dilating bag beneath the edge of the placenta, in an incomplete placenta prævia, usually checks the hemorrhage without dissecting the placenta to any great extent from the uterine wall.

Objection has been made to the use of the largest sized Voorhees bag in vertex presentation in that it displaces the presenting part and favors prolapse of the cord. This objection is valid and the largest sized bag is rarely, if ever, used.

In placenta prævia this does not obtain, for labor is usually termi-

¹ Zentralblatt f. Gynäkologie, 1911, No. 5.

² American Journal of Obstetrics, July, 1911.

nated by podalic version and there is no objection to pushing aside the head. His experience seems to show that in complete placenta prævia the use of the bag beneath the placenta does not interfere more with the uteroplacental circulation than other methods of vaginal delivery, and does not produce great fetal mortality.

In the 49 cases, 14 were complete, 35 incomplete—in all, 4 maternal deaths, or 8.1 per cent. One of these was complicated by a flat pelvis requiring section, ending in death from infection; 1 died of toxemia; 2, or 4 per cent., died from uncomplicated placenta prævia, and 1 of these was moribund, living only thirty minutes after reaching the hospital. Of the 4 that died, 2 were complete placenta prævia, 2 incomplete, these latter dying of secondary conditions. The maternal mortality from treatment by the extra-ovular use of the bag in complete placenta prævia was 14.2 per cent.

When this method is compared with other methods previously in use at this hospital, a very considerable improvement in mortality is observed. This is also true as regards fetal mortality, in the latter cases 63.1 per cent. of the children viable on admission leaving the hospital alive.

The writer believes that conditions occasionally arise where Cesarean section is indicated for placenta prævia.

Edgar¹ reports 40 cases of placenta prævia treated in the Manhattan Maternity. The general line of treatment consisted in *controlling the hemorrhage* and securing *cervical dilatation by cervical and vaginal gauze packing*. Dilatation was completed by bimanual cervical dilatation, by the Pomeroy or modified de Ribes bag. Delivery was completed by version and breech extraction, forceps, simple breech extraction, or spontaneous parturition. Postpartum hemorrhage was prevented by packing the uterus with gauze, by hypodermoclysis, rectal or venous infusion, and other methods of treating shock. In some cases, labor was induced.

Of the 40 cases, 10 were central, 9 partial, and 21 marginal; 17 were emergency cases brought by ambulance; 17 were first seen at the onset of bleeding; in 23, hemorrhage had lasted from a few hours to several days; 23 cases only were exclusively treated by the hospital; the remaining 17 had received various treatments before entering the service. In 29 cases, cervical dilatation was two fingers or less when first seen.

Version and breech extraction were done in 20 cases, forceps in 6, simple breech extraction in 5, spontaneous delivery in 8, making with 1 case undelivered, 40 patients. All were treated by a tampon in the uterus after delivery.

The maternal mortality was 7.5 per cent., the infant mortality, 32.25 per cent.

¹ American Journal of Obstetrics, July, 1911.

Version and breech extraction gave a higher infant mortality than delivery by forceps, simple breech extraction, or spontaneous expulsion.

THE BEST AND WORST METHODS OF TREATING PLACENTA PRÆVIA. Under this title Fry¹ discusses the various methods of treating placenta prævia, emphasizing the advantages of bipolar version and slow delivery, and warning against rapid dilatation and immediate extraction. In central placenta prævia with undilatable or cicatrized cervix, abdominal section may be indicated.

Newell² concludes the discussion of this subject, and draws attention to the fact that we can expect no improvement in the results obtained in the treatment of placenta prævia until the general practitioner is brought to believe that hemorrhage during the latter months of pregnancy is a serious symptom demanding competent investigation and treatment.

He calls attention to the hemorrhage which often follows extraction in these cases, and believes that it frequently results from extensive and dangerous tears of the cervix. As such cases often become septic, he is accustomed to pack the uterus with gauze soaked in alcohol, and when the gauze is removed to irrigate the uterine cavity with 50 per cent. alcohol.

DEVELOPMENT OF PLACENTA PRÆVIA. Jolly³ publishes a paper, with several interesting illustrations, upon the subject of placenta prævia.

He concludes, from his study of these specimens, that placenta prævia develops when the ovum attaches itself primarily to the inferior portion of the uterus. This depends somewhat upon the place at which impregnation occurs. There is a distinct period between impregnation and what he terms a condition of the ovum suitable for attachment. The nearer to the uterus impregnation in the tube occurs, the further does the impregnated ovum pass in the uterine cavity before it is sufficiently developed to attach itself to the wall of the uterus. Various conditions in the uterine mucous membrane in different portions of the uterus have influence in the insertion of the ovum. Endometritis may prevent normal insertion, and myoma of the uterus is often a cause of placenta prævia. The placenta may develop above the internal os in the decidua capsularis so that it may form the external membrane of the ovum at its lowest point covering the os and bringing about the development of the lower portion of the placenta prævia. The nutrition of this portion of the placenta is effected through the decidua. This decidua capsularis and decidua vera may unite at the internal os as they do over the openings of the Fallopian tubes. This union is easily destroyed by the dilatation of the internal os or by the extravasation of blood. The

¹ American Journal of Obstetrics, July, 1911. ¹

² Ibid

³ Archiv f. Gynäkologie, 1911, Band xciii, Heft 1.

decidua vera seldom covers the internal os, as this is usually closed by the decidua capsularis.

In the early months of pregnancy, placenta prævia may present the signs of carcinoma in the body of the uterus. The low attachment of the ovum in placenta prævia is a frequent cause of spontaneous abortion. Bleeding occurs in placenta prævia by the separation of the decidua capsularis from the decidua vera through the dilatation of the os and the opening of vessels in the decidua capsularis which are in communication with the vessels at the site of the placenta. A little later partial separation of the placenta from the uterine wall or laceration of placental tissue develops.

So far as treatment is concerned, the indications are to compress the bleeding portion of the placenta and secure dilatation of the cervix. Abdominal and vaginal section, and the Bossi methods of dilatation, are not advisable. Where hemorrhage has been extreme, total abdominal extirpation of the uterus may be considered.

Ectopic Gestation. THE DIFFERENTIAL DIAGNOSIS OF ECTOPIC GESTATION. Velits¹ reports 11 cases of ectopic gestation between the years 1891 and 1905, while from 1906 to 1910 inclusive, 32 cases came under observation.

The explanation for the increased number of cases is shown in the improvement in diagnosis which has become general with the increased knowledge concerning this condition. He draws attention to a number of cases which, for various reasons, were not subjected to operation, among them being 6 which showed in 4 hematocele as large as two fists which underwent absorption in from eleven days to three weeks to very much less than its original size. One patient who positively declined operation had a tumor upon each side reaching to the iliac spine and between these tumors the uterus could be made out. Both tumors dipped down into the pelvis in Douglas' cul-de-sac, the patient had the typical signs and symptoms of ectopic gestation, and, after pain and hemorrhage, discharged a large mass of decidua from the uterus. She left the hospital declining operation, and her subsequent history could not be obtained.

In another case, a large hematocele was observed by a puncture through the vaginal cul-de-sac, partial absorption only finally resulting. In this case, radical operation could not be obtained. In 6 cases, hematocele was completely absorbed, leaving no appreciable trace. In 1, the tumor was as large as a fist and disappeared in thirty-five days. In another, the tumor was as large as the head of a newborn infant, and was absorbed in sixty-four days. In another, the tumor practically filled Douglas' cul-de-sac and disappeared in five and a half months; while in 3, it was as large as two fists, disappearing in 1

¹ Monatschrift f. Geburtshilfe und Gynäkologie, 1911, Band xxxiv, Heft 4.

in five and a half months, leaving the uterus fixed in retroflexion; in the second being absorbed in a year; and in the third in sixteen months. In 3 cases, some remnant of the hematocele could be discovered; 1 after thirty-six days was as large as an egg; 1 after two months was as large as a walnut; and 1 after two months was the breadth of two fingers. Another, in which the tumor was as large as the head of a nursing child, in five weeks had been absorbed fully two-thirds. In 2 cases the hematocele ruptured into the vagina, and in 3 cases into the rectum.

These cases showed disturbance of temperature, some of them having chills and giving evidence of infection.

The question arises whether it is always possible, in such cases, to distinguish between tubal pregnancy and hematocele or a pyosalpinx which ruptures into the vagina or rectum. In 21 cases, one death occurred in a patient in whom the tumor ruptured into the bowel, followed by peritonitis and pyemia.

The mortality of the series treated in a conservative way was 4.7 per cent.

In a series of cases in early pregnancy before the placenta was formed, operation was done in 16 patients; 2 had been for some time under observation; 2 were operated on in the third week after entering the hospital; 3 in the second week; 4 in the first week; and 5 immediately after admission. In many of these, operation was done through the vagina, and in some by abdominal section.

Some of these cases presented considerable difficulty in the diagnosis. In one, both Fallopian tubes seemed to be enlarged and possibly distended with fluid, and tincture of iodine was applied by injection through the vagina. The patient was absent from the hospital at her home for some time, and returned with a considerable hematocele in Douglas' cul-de-sac.

At operation, many adhesions were found between the omentum, the uterus, and the underlying organs. The right Fallopian tube showed a tubal abortion and hematosalpinx. Another patient had apparently gone over time and had felt no fetal movements for two months. Her abdominal circumference had lessened somewhat and for six weeks there had been a bloody discharge from the vagina. On palpation, a left-sided oval tumor could be found which had displaced the uterus. On abdominal section, an intraligamentary pregnancy was present.

Another patient had a tumor which had been diagnosed as malignant, probably associated with the right tubes and ovary. At operation, the tumor was greatly adherent, and during manipulation some of the adhesions ruptured and fetal bones were found in the cavity of the tumor. The appendix, tube, and ovary were removed, as all had been involved in the development of the tumor.

Another patient came to the hospital for appendicitis, having a suspension of menstruation. She had suffered for some time with indefinite pain, and after a sudden uterine hemorrhage was sent to the hospital by her attending physician. When section was performed, a tumor adherent to the bowel, appendix, posterior surface of the uterus, and omentum, was present. Diseased tissues were removed and the pelvis drained by a Mikulicz tampon.

Another case gave a history of suppuration occurring at the navel and that a considerable quantity of serous fluid had been discharged through this opening. A tumor developed which caused the patient to seek advice in the hospital. On examination, there was at the navel a reddish scar-looking mass of tissue on which was situated a tumor as large as a man's head, fluctuating, which could be traced with its inferior pole, filling the right half of the pelvis. The uterus was of normal size. At operation, the entire anterior surface of the tumor was firmly adherent to the abdominal wall. The tumor ruptured near the navel, and a quantity of odorous pus escaped. When the tumor was irrigated, the placenta was found partially necrotic and its removal was followed by the escape of a considerable quantity of pus. In the right half of the pelvis another pus sac as large as a fist was discovered. A portion of the tumor extended up to the under surface of the liver, while the tumor was adherent to the mesentery and coils of intestine. It was impossible to remove the sac, and, after cleansing, it was tamponed with iodoform gauze. The patient was two months in the hospital, while the tumor slowly contracted. There was no evidence of fetal tissue to be found.

About six months afterward she again presented herself with a tumor which at first was thought to communicate with the bladder, but afterward proved to be separate from it. Some months after, an ovarian cyst of considerable size was present, extensively adherent. The effort to remove this resulted in the patient's death.

Upon examination, there had been two papillary cysts which had developed from the ovaries, and on the right side no trace could be found of a Fallopian tube.

This case must have been primarily an ectopic gestation in which the fetus had disappeared by absorption, leaving the placenta. Several cases are reported where the symptoms were typical of ectopic gestation but which were found to be hydrosalpinx or ovarian cyst. In one case, the tumor complicated a normal pregnancy and the diagnosis could not be clearly made out until the normal pregnancy had terminated. Cases of bicornate uterus in which it was impossible to positively diagnosticate the condition without section, are also reported.

In one specially interesting case, intra-uterine pregnancy was evidently present, and complicating it an ovarian cyst or extra-uterine pregnancy. An effort was made to push the tumor out of the pelvis, as it was thought

to be ovarian. After some weeks of observation it was made out that the case was one of retroflexed pregnant uterus, and the uterus was replaced by introducing an elastic bag filled with mercury. The patient went to her home, where she was subsequently delivered, and was seen afterward suffering from puerperal septic infection. There was a perimetric exudate, but the patient gradually made a good recovery.

UTERINE PREGNANCY OCCURRING AFTER EXTRA-UTERINE GESTATION. Essen-Möller¹ has investigated a very interesting occurrence of intra-uterine pregnancy after extrauterine gestation. He has collected the reports of others, and adds his own observations in 56 cases coming under observation in the hospital at Lund during ten years time.

He finds that uterine pregnancy may occur after the patient has recovered from tubal gestation without operation in the proportion of 46 to 100.

There seems to be no difference in the occurrence of pregnancy with or without operation, except that abdominal drainage after ectopic gestation seems to make the occurrence of normal pregnancy afterward less frequent. In cases which recover from ectopic gestation without operation, subsequent intra-uterine pregnancy was without complications.

EXTRA-UTERINE PREGNANCY AT TERM. Wagner² reports the case of a patient whose last menstruation occurred one year before her admission to Rosthorn's clinic. Soon after menstruation ceased, the patient suffered from severe cramp-like pain and irregular hemorrhage. At three months she was admitted to the hospital, where she remained under observation for five weeks. At this time the abdomen was distended, very painful, and in the ileocecal region there was an area of resistance. The uterus was enlarged and at the right side there was a tumor, sensitive, the size of two fists, which was supposed to be an exudate. A diagnosis of parametritis was made, and the patient was treated by rest in bed with the application of an ice-bag and other medicinal measures. The tumor decreased somewhat in size, and the patient was sent to her home for treatment by her physician.

As her pains did not cease, the patient consulted another physician, by whom a diagnosis of pregnancy was made, and fetal movements soon afterward became apparent. These ceased three months later, the pain grew much less, and the patient came to the hospital. The abdomen was distended, the abdominal wall very thin, the tumor reaching to within two fingers' breadth of the tip of the sternum. Something resembling a fetal head could be made out. A softer mass could also be discovered, which seemed to be in connection with the uterus by a pedicle.

¹ *L'Obstétrique*, 1911, No. 3.

² *Zentralblatt f. Gynäkologie*, 1911, No. 8.

At operation, the fetus was enclosed in a grayish-white capsule. The tumor, supposed to be the placenta, proved to be a hydrosalpinx on the left side. The appendix was adherent to the tumor, the ovaries were normal, and the placenta was found also encapsulated. The fetus was 48 cm. long. It was possible to remove the placenta and sac, the patient leaving the hospital in good condition twelve days after operation.

REPEATED ECTOPIC PREGNANCY, WITH REPORT OF FOUR CASES. Smith¹ reports 4 cases of repeated ectopic pregnancy. In the first a ruptured left tube was removed, the right tube and ovary appearing normal. A year after, a second ectopic pregnancy occurred and the ruptured right tube was removed with the appendix. Both ovaries were left.

In the second case, the right tube and ovary were first removed for ectopic pregnancy, with the appendix. There were many adhesions and the patient's recovery was complicated. Two years after, the ruptured left tube was removed.

In the third case, the first pregnancy was in the left tube, which was removed without the ovary. There were many adhesions and the right tube was buried in adhesions, but was left, as it appeared normal. About two years afterward the right tube and appendix were removed.

In the fourth case, a multipara, the right tube and ovary separated from their attachments during operation, as there had been extensive rupture with great hemorrhage. The left tube and ovary seemed normal. A year afterward ectopic pregnancy occurred in the left tube, which ruptured and it was removed. At the patient's request, hysterectomy with the removal of the tube and ovary was performed.

All these patients made ultimately good recoveries.

In reviewing the literature of the subject, the percentage of recurrence is slightly less than 3.8. Between the ages of twenty and twenty-nine, and thirty and thirty-nine, the frequency of recurrence is the same. The mortality rate of the second ectopic pregnancy was 13 per cent. plus. The average interval between the two ectopic pregnancies was almost exactly thirty months. In one case, Baldy's, an interval of twelve years elapsed between the operations. During the interval 6 per cent. of patients had pregnancies. The second ectopic gestation occurred in almost all cases in the remaining tube. In a number of cases, the second ectopic pregnancy developed in the same tube, which had been left open, or had aborted after the first ectopic gestation. In some cases the first ectopic was ovarian, and the subsequent ectopic pregnancy tubal. A few cases are on record in which three ectopic pregnancies have occurred in the same patient.

It was difficult to obtain exact data as to the question of normal

¹ American Journal of Obstetrics, September, 1911.

pregnancy following ectopic gestation. In Smith's own cases—36 operations—he has been able to trace 33; 3 of these have had subsequent intra-uterine pregnancies. This would indicate that normal pregnancy, after ectopic gestation, is not common and cannot be confidently expected.

The interesting question arises, "What shall be done in operating upon ectopic pregnancy with the opposite tube?" Smith suggests the following:

If a woman has had no children, and is young, or desirous of having children, the opposite tube should be preserved unless it is hopelessly closed. In women who have borne children, the surgeon must be guided by the patient's wish in the matter, and the tube may be left unless it is absolutely closed. When patients have had children, and do not desire more, and request that further conception be made impossible, the opposite tube should be removed to prevent the possibility of recurrent ectopic pregnancy, whether the tube appears normal or not.

LABOR

Labor during Adolescence. Bondy¹ has studied 1000 cases of first labor in women between the ages of fourteen and twenty-seven years. In one patient, aged fourteen years, the mother was a fairly developed girl. The first stage of labor lasted twenty-four hours, the second, one hour and forty-five minutes. The child, a male, was born spontaneously, was 50 cm. long, and 3120 grams in weight. There was a slight laceration of the perineum, which was repaired, and healed without complications. The mother nursed the child, and the puerperal period was normal.

There were 7 cases where the mother was fifteen years of age, and, of these, 4 of the children were male and 3 female. Two were born prematurely in the ninth month, the others at full term. The weight of the children was average. The first stage in labor was twenty hours, the second, two hours. There was one face presentation which terminated in normal birth without laceration, although the child was large; and one breech presentation which required assistance; in one case, slight hemorrhage occurred which terminated with the delivery of the placenta. There was little laceration. Mother and child made good recoveries.

At the age of sixteen years, 51 births are recorded, with 29 male children and 23 female children, one patient having twins. There were 2 cases of labor at the eighth month, and in the ninth and tenth—in all, 23 per cent. of premature children, the weights being somewhat

¹ Zeitschrift f. Geburtshilfe und Gynäkologie, 1911, Band lxxix, Heft 1.

greater in variation than the preceding. In 9 of the cases the first stage of labor was somewhat prolonged, and in 8 the second period. There were 5 breech presentations, and one monstrosity. One case had contracted pelvis with a true conjugate of $10\frac{1}{2}$ cm. One patient had severe eclampsia. Her labor was terminated by the application of forceps, and she had eighteen convulsions before delivery and three afterward, finally recovering. The obstetric operations practised were manual dilatation; in the case of breech presentation, low forceps; low forceps in one case for feeble heart sounds, and high forceps in the case of eclampsia. The placenta was manually removed in one case. In all, 23 per cent. had lacerations of the perineum, which were repaired; 3 of these patients had slight fever, one, the case of eclampsia, severe fever during the puerperal state. Beside the monstrosity, the child of the ectopic mother was stillborn, and one child died during the first week from enteritis; 38 per cent. of the remainder had regained and exceeded their original weight in the first eight days.

When these young patients are studied, it is seen that labor presented few complications. The children were most of them at full term and well developed. Breech presentation was more frequent than normal. Obstetric operations were not often indicated, and lacerations were not frequent.

There were 5 cases of young women having children twice. One of these patients was sixteen years of age, and one seventeen. In the other 3, the first labor had occurred at sixteen years of age. In one, menstruation developed first after her first labor. The second labor in these patients was spontaneous, and the children were at full term.

As regards the sex of the children—between the ages of fourteen and seventeen years, male children were more frequent than female. Between eighteen and twenty, female children were slightly more numerous. Between twenty-one and twenty-three years, there was very little difference, and between twenty-four and twenty-seven years, a very slight difference in the number.

It is interesting to note that the percentage of children carried to full term was 74 in the majority of these cases; but in those patients between the ages of twenty-one and twenty-three years, the percentage was 80. The largest children were born of mothers aged between eighteen and twenty years, although none of the children were greatly below the average. The elasticity of the tissues, in young patients, seems to be the principal factor in bringing about spontaneous and normal parturition. After the age of twenty, the second stage of labor began to be somewhat longer. After the twenty-first year, the expulsive efforts of the uterus seemed to be somewhat less, or the elasticity of the tissues seemed to be greater.

As regards abnormal presentations when the head presented, brow and parietal presentations were rarely, if ever, observed. Face presenta-

tion occurred in 0.3 of 1 per cent.; in 3 per cent. there was breech presentation, more frequent in the youngest mothers, where it reached 4.8 per cent. Transverse position shoulder presentation was frequent, in only 0.1 of 1 per cent. Twins were observed in but 0.8 of 1 per cent.

Regarding obstetric operations in these patients, the forceps was applied in 5.6 per cent., in the first group or youngest mothers; forceps was used least frequently between the ages of twenty-one and twenty-three years; between twenty-four and twenty-seven years forceps was used much more often in the interests of the child; breech presentation required manual assistance, and version was performed once for transverse position, once for eclampsia, and once in twin pregnancy; craniotomy on the dead child was done five times, and in no case upon the living fetus; there were six vaginal Cesarean sections for eclampsia.

In the group between fourteen and seventeen years of age, and that of twenty-one and twenty-three years, there was but one abdominal Cesarean section; none between the ages of eighteen and twenty; and 9 between twenty-four and twenty-seven years. In all of these cases, the operation was done for contracted pelvis. When an external conjugate of 11 cm. is taken as the basis of the estimate of contracted pelvis, this abnormality was found in the whole series in 5.7 per cent. In the first group, between fourteen and seventeen years, the pelvis was contracted in 5.2 per cent., in the second, between eighteen and twenty, in 3.6 per cent.; in the third group between twenty-one and twenty-three years, in 4.8 per cent.; in the fourth, between twenty-four and twenty-seven years, in 9.2 per cent.

This Bondy explains by the increased development of rachitis as the patients grew older. There seemed to be very little increase in morbidity in any of these groups as regards the delivery of the placenta.

As regards laceration, patients between eighteen and twenty years showed the smallest percentage, and after this the frequency of laceration increased with considerable rapidity.

As regards diseases complicating pregnancy, disorders of the genital organs are infrequent in very young patients. Pulmonary disease is comparatively common. Among the 1000 cases, there were 27 of eclampsia, with a mortality of 11.1 per cent. It could not be observed that this complication was less common in the very young patients, but, on the contrary, in the first two groups it was more frequent than in the older women. Placenta prævia was exceedingly rare, and but one case was observed. Infection in the puerperal period developed in 16.4 per cent. between the ages of fourteen and seventeen; in 20 per cent. between the ages of eighteen and twenty; 20.8 per cent. between the ages of twenty-one and twenty-three; and 17.2 per cent. between the twenty-fourth and twenty-seventh years.

There were 4 maternal deaths in all, 3 occurring from eclampsia, and 1 from pneumonia. There was no death from puerperal sepsis.

When the children are considered, it was found that most of the mothers could nurse the children, and the taking as a test of their success was the regaining of the infant's original weight in the first eight days following birth; it was found that between the ages of fourteen and seventeen years, 38.2 per cent. had accomplished this gain; between the ages of eighteen and twenty, 40.4 per cent.; between the ages of twenty-one and twenty-three, 42 per cent.; between the twenty-four and twenty-seventh years, 42.6 per cent.

The percentage of disease among the newborn was small and not specially significant.

When the mortality of the newborn is considered, between the maternal ages of fourteen and seventeen years, the fetal mortality was 3.2 per cent.; between eighteen and twenty years, 3.2 per cent.; between twenty-one and twenty-three years, 5.2 per cent.; between twenty-four and twenty-seven years, 6.4 per cent.

The conclusion of this study is against the belief that woman is best fitted for childbirth at twenty years of age or later. These cases would seem to indicate that the age of successful maternity should be advanced to between the eighteenth and twentieth years, and that the physiological period for first parturition may be extended to between the ages of eighteen and twenty-three years. After twenty-three years, the circumstances favorable to parturition change with great rapidity. Even the period between the fourteenth and seventeenth years is by no means an unfavorable period for maternity.

Labor Complicated by Circular Laceration of the Vagina. Esau¹ reports the case of a patient, aged thirty-six years, who six years previously had given spontaneous birth to a child weighing 5 pounds. Labor developed spontaneously at the end of the second pregnancy, but progress ceased; forceps was tried without result, and podalic version performed with perforation of the after-coming head. There appeared after the birth of the child a bluish mass in the vagina which resembled intestine. This was replaced, the after-birth delivered, and the patient was sent to the hospital.

Upon admission, the patient was pale and prostrated from labor, the external genital organs showed no lacerations, and there was but slight hemorrhage. After the blood clots had been removed from the vagina, a circular mass of tissue the thickness of the thumb, was observed. This seemed to have come from the upper portion of the vagina, and on the right side of the cervix there was an extensive wound into the vaginal tissue extending almost to the peritoneum. The uterus was contracted, but very movable. The circular mass of tissue was very slightly attached, and, as it seemed impossible to stitch it in place, it was removed. The wound was tamponed with gauze, and the uterus also.

¹ Monatschrift f. Geburtshülfe und Gynäkologie, 1911, Band lxiii, Heft 1.

Upon examining the tissue which was removed, its circumference was 30 cm.; its breadth varied from 2 to 5 cm. It was found to be vaginal tissue and to have been a circular laceration throughout the whole extent of the vagina. The patient's recovery was complicated by parametritis, which, on the right side, terminated in suppuration, with edema of the labia. Vaginal drainage, fortunately, was sufficient without operation, and the patient made a fairly good recovery in four weeks. Upon leaving the hospital, there was cicatricial contraction of the vagina at the site of laceration. The patient ultimately made a good recovery.

Labor Complicated by Progressive Muscular Atrophy. Zutzmann¹ reports the case of a patient, aged twenty-four years, healthy until fourteen, who had a brother suffering from progressive muscular atrophy. In the fourteenth year of the patient's life this disease developed in her. At twenty years of age she could walk with great difficulty, and the strength of the arms was much diminished.

When admitted to the hospital, she was in the last month of pregnancy and had grown much worse during pregnancy.

Upon examination, the strength of the arms was greatly diminished in the biceps and triceps. The muscular power of the fingers seemed to be good. Various groups of muscles in the back and shoulders were involved. There was slight scoliosis in the thoracic and lumbar vertebra. The serrati muscles were atrophied. The muscles of the neck were wasted, and the thyroid was enlarged. The pectoral and trapezius muscles were wasted, and the thighs were atrophied. There was a considerable deposit of fat. There were a few small areas of increased sensibility. The muscles reacted differently to electricity, but the abdominal muscles gave no reaction to the electrical current.

Labor pains gradually developed, with premature rupture of the membranes. The pelvis, and position and presentation, were normal. The head remained impacted at the pelvic brim. The head descended very slowly, and the fetal heart sounds gradually sank to less than 100. Efforts to arouse muscular action in the patient were unsuccessful, and the fetus was finally expressed by pressure upon the abdomen. The child seemed a vigorous, well-developed male. There was no laceration of the perineum and the placenta was normally delivered. The patient nursed her child, and the puerperal period was complicated by a mild attack of mastitis and tonsillitis.

In Fleischmann's case, labor occurred prematurely in the ninth month, the mother having just minor, moderately contracted pelvis. A contraction ring developed, the forceps was applied, and the child delivered. The patient died fifteen days after delivery from double pneumonia.

¹ Zentralblatt f. Gynäkologie, 1911, No. 17.

Gerhardt's patient had a slightly contracted pelvis with separation of the symphysis. Labor was complicated by prolapse of the umbilical cord, and was terminated by the use of forceps. The occiput rotated posteriorly.

During delivery, the left ramus of the pubis was fractured and there was a deep laceration of the vagina. The child was unusually well developed. The mother's puerperal period was complicated by fever and vesical catarrh.

In these cases, labor may be complicated by deficient expulsive efforts and by imperfect maternal development. The weakening of the muscles of respiration renders the patient especially liable to pulmonary congestion and pneumonia.

Labor Complicated by Ovarian Tumor. Braun¹ reports the case of a primipara, aged twenty-six years, who, during her pregnancy, suffered from disturbance of the bladder apparently occasioned by pressure, and with backache. The use of the catheter was necessary on one occasion, although the presence of the tumor was not detected. Labor developed slowly, with intermittent pains, until the rupture of the membranes.

When the patient was seen, the abdomen was greatly distended, apparently more upon the right side. The fundus of the uterus was at the edges of the ribs, the position and presentation normal, the head above the pelvic brim, and strongly pushed over toward the right side. The heart sounds were good. Upon vaginal examination, a cystic tumor was found. The cervix was high in the pelvis and pushed strongly up on the left side behind the pubis. The external os admitted two fingers, the head could be felt freely movable with a considerable caput. The tumor could not be palpated through the abdomen and could not be moved by pressure made in the vagina. The patient's temperature and pulse were normal, but uterine contractions were weak and diminished.

The patient was brought to the hospital and given morphine, and on the following day labor pains became stronger. Cesarean section was performed, and the child and appendages removed without difficulty. Behind the uterus there were found cystic degenerated ovaries, the right being smaller, and the cyst 18 cm. in length, the lower end filling the pelvis and adherent above to the mesentery and intestine. The cysts were removed with a supravaginal amputation of the uterus and dropping of the stump. Both tumors proved to be dermoid. Mother and child made a good recovery.

Labor Complicated by Injuries of the Bladder. Rosinski² showed before the Gynecological Society of Königsberg the case of a patient who had been attended in labor by a midwife, who had attempted during the

¹ *Monatsschrift f. Geburtshülfe und Gynäkologie*, 1911, Band xxxiii, Heft 3.

² *Ibid.*, Heft 2.

pains to introduce both hands into the vagina. Such extensive lacerations had occurred that the anterior vaginal wall had disappeared, and the anterior wall of the bladder had prolapsed.

In discussion as to what could be done for this patient, Hofbauer had seen a case of very large vesico-vaginal fistula following a very difficult version, performed without anesthesia. This fistula was successfully closed by operation.

Schroeder did not believe that operation upon the vaginal wall would be sufficient in Rosinski's case because it would not form a sphincter for the bladder. He would endeavor to separate the bladder from the connective tissue and repair the bladder and urethra, and then endeavor to form vaginal tissue afterward. In one case upon which he had operated, this method was successful; in another he was obliged to use peritoneal tissue from the uterus to cover the defect. Both patients recovered with continence and restoration of the function of the vagina.

Fuchs would operate upon the trigone of the bladder and would, if necessary, transplant the ureters into the bowel.

Semon, in a complicated case had made an incision above the pubis, separated the bladder from scar tissue, and by repeated operations had closed the fistula.

Labor Complicated by Imperforate Anus. Smiley¹ reports the case of a well-developed primipara, with strong labor pains, who had imperforate anus, the rectum opening into the vagina two inches above the vaginal orifice. At the opening of the bowel there was an elliptical sphincter sufficient to give the patient control of the bowels. There was a very firm perineal body or muscular band extending from the perineal body to the coccyx. The sacrum was pushed somewhat forward. The vaginal orifice would admit only two fingers and hypospadias was present. The head was engaged, but spontaneous labor failed, and under anesthesia a female child weighing $9\frac{1}{2}$ pounds was delivered. The perineum was somewhat torn. For thirty hours after delivery the patient was unable to pass urine, and catheters and applications were ineffectual. An injection of 2 per cent. boric acid in glycerin into the bladder produced a discharge of urine. On the third day fever developed, and the bowels were moved on the fifth day. From the fifth to the twelfth days there was considerable fever, with foul-smelling uterine discharge. This finally ceased, and mother and child ultimately made a good recovery.

The Treatment of Labor Complicated by Operations for Antefixation. Schauta² believes that all operations for antefixation of the uterus result in too firm a fixation. Shortening of the round ligaments does this to a less extent than other operations. Although the bladder is

¹ Journal of the American Medical Association, December 23, 1911.

² Monatsschrift f. Geburtshilfe und Gynäkologie, 1912, Band xxxv, Heft 2.

somewhat encroached upon at first, it usually accommodates itself to the changed condition. So before pregnancy the uterus and intestine do not, as a rule, encroach upon each other.

When pregnancy occurs, the relations are at once disturbed. The scar tissue produced by shortening of the round ligaments will usually dilate sufficiently to permit the uterus to develop; but when infection or inflammation has followed operations for ante-fixation, masses of scar tissue develop between the uterus and surrounding organs which interfere with the development of the pregnant womb. This is specially apt to occur in cases of direct fixation.

We may distinguish three grades of complications resulting at labor from previous ante-fixation of the uterus. In the first and last series we find the os high in the pelvis and drawn strongly backward, but still beneath the promontory of the sacrum; while in the second grade of this complication the os is at the level or above the promontory of the sacrum; while in the third grade it is above the promontory, and as high as the lumbar vertebra. In many cases of the first grade, spontaneous labor results, while in the second grade of complication, version or splitting of the anterior lip of the cervix may suffice; cases in the third grade are those of decided ante-fixation. Spontaneous labor is here impossible, and unless the patient is delivered by operation, the death of the fetus with infection, physometra, and uterine rupture must result.

In dealing with these cases, the fear of uterine rupture must always be kept in mind. In pathological ante-flexions, this apprehension is well grounded. The forces of labor are exerted on the posterior wall of the uterus, and the danger of rupture is in that portion. When the uterus has been subjected to ante-fixation, the force of labor is exerted against the os and cervix, and less against the posterior wall.

In cases delivered by Cesarean section, excessive thinning of the posterior uterine wall has not been observed from distention of the lower uterine segment, nor the development of a contraction ring. Uterine rupture does not develop in the usual manner in contracted pelvis.

Schauta quotes 4 of his cases, 3 of them terminated by version, 1 by dilatation with bags and craniotomy, the patient dying from puerperal infection.

He considers in these cases the important factor to be the unnatural direction in which the forces of labor are directed. Instead of being in the axis of the pelvis, the force of labor works in the axis of the lumbar vertebræ. The portion of the uterus between the external os and the site of the pathological fixation offers an obstacle to the exercise of the forces of labor. Delivery is only possible when force is exerted in the natural direction. When this cannot be accomplished, Cesarean section is the only alternative.

In cases of pathological anteversion without fixation, where the os was at or above the promontory, if a foot was brought into the pelvis the body of the child would produce the same result as an elastic bag inserted from below. Gentle but continuous traction upon the foot will produce dilatation. The undilated portion of the uterus at the point of fixation would thus gradually be developed. The process must be a very slow one to avoid laceration.

The treatment of these cases may be divided under four heads: First, is the simple expedient of pulling the cervix forward toward the pubis. If this be done at frequent intervals, while the patient is having pains, the birth canal will gradually dilate and the head enter the pelvis in a favorable position.

The second method of treatment consists in splitting the anterior lip of the cervix through the os longitudinally. This is specially useful in cases of vaginal fixation, and this procedure should be accompanied by the freeing of the bladder and pushing it upward to permit the descent of the head.

In many of these cases the fetus is in transverse position and here it may be necessary to produce sufficient dilatation to perform version and bring down a foot. One may also employ dilating bags to gradually increase the lumen of the os and straighten the birth canal. Occasionally craniotomy may be necessary.

In 1905, Seegert reported 22 cases of Cesarean section in which ventrofixation had previously been performed. Since this time Schauta has collected 7 cases of Cesarean section after ventrofixation, and 4 Cesarean sections after vaginal fixation. Recent discussions upon this subject before obstetrical societies indicate that the operation is considered justifiable in the presence of this complication. Schauta would limit the application of section, as he considers it more dangerous than in uncomplicated cases, because of the presence of scar tissue at the fixation point. This would render the extraperitoneal method impossible and would also interfere with the performance of the Porro operation. Schauta believes that it is often possible to do these cases without section.

In order to prevent this complication of labor, he would practice the indirect method of fixation originally described by Doléris, or one of the other methods by which the round ligaments are utilized.

Labor in the Bicornate Uterus. Klages¹ reports the case of a patient admitted to the hospital because of sudden hemorrhage from the genital tract.

The patient gave a history of hemorrhage two weeks before, and that the hemorrhage had recurred at irregular intervals. Upon examination, a finger could be passed through the internal os, and placental

¹ Zentralblatt f. Gynäkologie, 1912, No. 6.

tissue was found upon the right side. Upon the left side of the cervix, a foot of the child could be detected. While the patient remained quietly in bed, the hemorrhage did not return; but the patient persisted in leaving the hospital to care for a child ill at home. She returned in a few days, having again had hemorrhage. Shortly afterward she had a severe hemorrhage, followed by the gradual development of labor pains.

Upon admission, she was pale, with a rapid and feeble pulse, and, on examination, the external os was about half dilated. Placental tissue covered three-quarters of the lumen. The membranes were unruptured, and a foot of the child could be detected. An elastic bag was inserted and pituitrin given by hypodermic injection. Dilatation proceeded very slowly, and, under the pressure of an elastic bag the cervix was gradually opened. Fetal heart sounds could not be heard. The membranes were ruptured and a dead child delivered; a tear in the cervix was closed by suture. The placenta was readily removed. The patient made an uninterrupted recovery.

Upon examination before leaving the hospital, it was found that the patient had a bicornate uterus, one-half of which remained in its original size and had not enlarged during pregnancy. The fact that the muscular tissue is usually poorly developed in the bicornate uterus accounted for the patient's feeble labor pains and for the tendency to placenta prævia.

Cesarean Section for Ventrofixation. Ferguson¹ reports the case of a patient who had had two children and who had suffered from lacerations and displacement of the uterus. This was treated by the operation of ventrofixation. When pregnancy followed, she suffered from greater nausea and vomiting than usual, and pain referred to the abdominal incision.

Upon examination during labor, the cervix could not be reached by the examining finger. On anesthetizing the patient and introducing the entire hand, the finger passed above the promontory of the sacrum, the os was partly dilated, and pointed directly backward to the fourth lumbar vertebra. The head was presenting, and amniotic liquid was escaping with each contraction of the uterus. The anterior uterine wall below the point of fixation was greatly thickened and occupied the larger part of the strait. An attempt was made to pull the cervix forward and to bring the uterus into the axis of the birth canal. When the anesthetic was removed, the first vigorous pain drew the cervix again upward and backward. Podalic version was then attempted, but a contraction ring was encountered at the point of fixation. Cesarean section was then performed, extraction of the head being difficult by reason of the contraction ring which grasped it below the

¹ Journal of the American Medical Association, 1912, No. 7.

chin. To deliver the head, it was necessary to extend the uterine incision into the fixation band.

Mother and child made a good recovery.

The reviewer has several times had to deal with cases of labor complicated by ventrofixation. He has performed section in these cases, terminating one case by hysterectomy. Uncomplicated recovery has followed, and the conditions have been such in each case that section was the only safe procedure.

THE UTERINE MUSCLE; CONTRACTION, RELAXATION, AND HEMORRHAGE

Experimental Studies to Determine the Reaction of the Uterine Muscle to the Electric Current. Rübsamen and Danziger¹ have studied the reaction of the uterine muscle to the electric current.

They find that the uterine muscle in the human subject and in guinea-pigs, reacts to galvanic stimulus by contraction which ensues after a given period of quiescence, and lasts for several seconds.

During spontaneous contraction of the uterine muscle which follows the application of the galvanic current, the muscle remains during this period insensible to all sources of stimulation. After this contraction has reached its maximum, the application of the electric current again produces reaction, followed by relaxation. The contraction following the electric stimulation is followed after a short interval by a number of irregular contractions, after which the natural tone of the muscle is resumed. While the uterine muscle is reaching the acme of its contraction, and while the spontaneous contraction wave is passing over, the response to stimulation is less than during the period of quiescence. If the electric stimulation is applied through the vagina by tubular electrodes through the muscle, the reaction is greater than by other methods. The uterus which contracts poorly, or not at all, automatically, can be aroused to contraction by the galvanic current. When one horn of the uterus of an animal is stimulated, the stimulus affects the other horn as well, but after a considerable interval. In many cases, after the subsidence of stimulation the tone of the muscle is increased, probably through the formation of acids in the muscle substance, which in time are again neutralized. When a muscle in the period of quiescence is stimulated by the galvanic current, contraction begins soon after the beginning of the application, which reaches its highest point where the current is fully applied, then diminishes to one-half its first extent; while if the stimulus be continuously used for some time the result is a period of regular and increased contraction. The period

¹ *Zeitschrift f. Geburtshülfe und Gynäkologie*, 1911, Band lxi, Heft 3.

of quiescence following galvanic irritation is 1.1 seconds for 1 milliampère, for 15 milliampères 0.2 of a second, and for 5 milliampères 0.4 of a second. The period of subsidence after the stimulation lasts from ten to twenty seconds and longer, depending upon the strength of the stimulation, the period of its application, and the height of the curve which marks its result. The uterine muscle, in response to galvanic stimulation, shortens from 5 to 20 per cent. of its original length; while if suprarenin or preparations of ergot be used, the muscle shortens to 90 per cent. This shows that the electric current produces a genuine uterine contraction and not a condition of tetanus.

The reviewer has always considered electric stimulation as one of the most efficient methods for causing the uterus to efficiently contract. After severe cases of postpartum hemorrhage, when secondary relaxation is feared, we have several times employed the interrupted faradic current with the best results. One pole may be placed over the lumbar region, the other over the uterus, and good results are often obtained by the application of one pole at the back of the neck and the other over the uterus. A tonic effect is also produced upon the vasomotor nervous system.

Experimental Studies in the Metabolism of the Uterine Muscle. Rübsamen and Bernstein¹ have studied the metabolism of the uterine muscle to determine its production of carbon dioxide in comparison with other muscles.

He finds that the uterine muscle occupies a position midway between the glandular tissues of the body of the skeleton muscles in the production of carbon dioxide. The granular tissues represent the least production, while the muscles of the skeleton represent the greatest amount.

The Reaction of the Uterine Muscle to Pituitrin. Stern² reports 3 cases, 2 of tuberculosis and 1 of severe nephritis complicating pregnancy and parturition. Pituitrin was given by hypodermic injection in doses of 0.6 gram, and afterward in doses of 0.1 gram. Efficient uterine contractions resulted, and the effect of the remedy was most satisfactory.

The Function of the Ovary and the Uterine Muscle in Uterine Hemorrhage. Theilhaber³ has studied the effect of ovarian tissue upon the production of uterine hemorrhage. He concludes from an extensive investigation and review of the literature that the beginning of uterine hemorrhage is often dependent upon the conditions in the ovary, but that the control and termination of such bleeding is brought about through the reaction of the uterine muscle. When, through excessive hyperemia, the action of the muscle is inefficient, the degree and duration of the hemorrhage is very much increased.

¹ Archiv f. Gynäkologie, 1911, Band xciv, Heft 1.

² Zentralblatt f. Gynäkologie, 1911, No. 31.

³ Archiv f. Gynäkologie, Band xciv, Heft 3.

A Method for Checking Uterine Hemorrhage. Cholmogoroff¹ describes a case of abortion in which he performed curetting, when arterial hemorrhage of considerable severity followed. Tamponing with iodoform gauze and the injection of iodoform-phenol in the uterine cavity, were without result.

As the patient was young, and it was desirable to avoid the removal of the uterus, it was determined to close the external os as tightly as possible in the hope that the bleeding would cease. Seven stitches were inserted into the vaginal portion, bringing it tightly together, when the bleeding ceased. The uterus did not perceptibly enlarge, and nine days afterward the stitches were removed, the patient making a good recovery.

Uterine Hemorrhage: The Result of Constitutional Diseases. Strina² reports 2 cases of tuberculosis, and 1 of heart lesions and nephritis, dying with postpartum hemorrhage.

Upon examining the uterus in these patients, the lack of the usual thrombi and emboli in the uterine vessels was observed, undoubtedly caused by the constitutional condition present.

This phenomenon illustrates the uncontrollable hemorrhage which one often observes under these circumstances.

The Closure of Vessels Postpartum. Frankl and Stolper³ draw attention to the function of the syncytium and decidual cells enclosing the vessels postpartum. They believe that this function is an important one.

ABORTION

The Prognosis and Treatment of Septic Abortion. Winter⁴ reports the results of his experience in the treatment of 100 septic cases of abortion.

Among these were 13 deaths from infection, 4 cases of pyemia, which were not fatal; 1 case of peritonitis, not fatal; 18 cases of parametritis; 10 cases of endometritis; and 54 cases in which the abortion proceeded normally, although infection was present. In 80 cases the streptococci were found in 10; hemolytic streptococci in 20; anhemolytic streptococci in 13; staphylococci in 24; bacterium coli in 10; and bacteria from the vagina in 3.

The virulence of these different germs can be inferred from the fact that where streptococci, not differentiated, were present, in 10 cases there were four fatalities. In 20 cases of hemolytic streptococci, six fatalities; in 13 cases of anhemolytic streptococci, no fatalities. In

¹ Zentralblatt f. Gynäkologie, 1911, No. 50.

² Annali di Ostetricia, 1911, No. 11.

³ Archiv f. Gynäkologie, 1910, Band xc, Heft 1.

⁴ Zentralblatt f. Gynäkologie, 1911, No. 15.

24 cases of infection by staphylococci, there was one death, and no deaths in 10 cases of infection by the bacterium coli; and 3 cases of infection by vaginal bacteria.

Two characteristic cases are described: The first had hemorrhage for seventeen days, without chills or local symptoms. On admission, the temperature was 100° F., pulse 104, abdomen soft and not sensitive, and the general condition good. The cervix admitted two fingers, and retained portions of placenta were found in the uterus. The uterine secretion contained hemolytic streptococci. The placental tissue was removed by the finger, and the uterine cavity disinfected. During the following night, symptoms of acute sepsis developed from which the patient died on the third day, although the uterus was extirpated through the abdomen.

In a second case, pregnancy proceeded normally until hemorrhage occurred at the fourth month, followed by the spontaneous expulsion of the fetus, the mother having a temperature of 103° F. As hemorrhage followed, the placenta was removed and a pure culture of hemolytic streptococci obtained from the uterus. The patient's general condition seemed so good that she got up and resumed her usual occupations. Severe sepsis immediately developed, from which the patient died in two days.

Winter compares the results in 63 cases treated by active interference with 17 cases without interference. In the first group were 10 deaths, and 9 patients severely ill. In the second group, 1 death, and 1 patient severely ill.

From his experience, he would treat these cases as follows: So soon as fever occurs in a case of abortion, evidently from uterine infection, before proceeding to examine and disinfect the uterus he would take a culture from the lower portion of the vagina. After careful disinfection he would then proceed to an internal examination. He would remove all portions of the ovum found in the vagina, but would not interfere with the uterus unless profuse hemorrhage was present. He would examine the material removed from the vagina with special care to detect hemolytic streptococci. If such were not found, or if but very few were observed, or the hemolytic power of these germs was very feeble, he would remove portions of the ovum if the cervix were dilated. He would carefully avoid violent dilatation, because the wound so created would be an open door for the entrance of bacteria.

If a pure culture of hemolytic streptococci was obtained, he would avoid intra-uterine manipulation. Every examination, every douche, every removal of portions of the ovum is a source of danger in these cases, and especially the production of fresh wounds of any sort.

If hemorrhage obliges the physician to interfere with the uterus, it should first be thoroughly irrigated and then the tissues remaining within the womb should be removed by the fingers. In these cases

the infection is usually limited to the endometrium, and if interference be not practised, bacteria may penetrate no farther, but gradually be destroyed and discharged. As a line of demarcation forms between healthy and infected tissue, the obstetrician must under no circumstances interfere with this natural barrier.

Missed Abortion. Rosenstein¹ refers to cases in which the placenta has long been retained after abortion, and to the difficulties which sometimes arise in the diagnosis and treatment of these patients. He reports one case where three months before the patient, a multipara, was seen, she had an abortion at three months' gestation. Three weeks after the abortion hemorrhage occurred.

The uterus was as large as a fist, and a diagnosis made of retained placenta. Under anesthesia the uterus was dilated, and a three months' placenta delivered.

In another case the patient's menstruation ceased for three months, followed by pain and uterine contraction. Four months later hemorrhage occurred, which was so severe as to require treatment. The uterus was enlarged, but without the characteristic shape and consistence of pregnancy. Under anesthesia, a placenta of between two and three months, was removed.

In a third patient, menstruation had ceased six months previously. For three months before coming under observation, the patient had had several attacks of hemorrhage lasting ten days. The uterus was hard and about the size of a fist. Under anesthesia a placenta of about three months, fetus and membranes macerated, were removed. This was evidently a case of missed abortion.

He also describes 2 cases of severe postpartum hemorrhage following missed abortion. The first patient had very severe hemorrhage lasting for three days, at about four months. This ceased, and about a month later the patient sought relief for pain in the limbs, chilly sensations, palpitation of the heart, and lassitude. She stated that fetal movements which had previously been felt, had ceased. The fundus was at the umbilicus, and firm. The patient was kept under observation, the uterus becoming gradually smaller until six weeks before what would have been full term, and three months after the apparent death of the fetus, when labor developed. The fetus and placenta were expelled with very strong uterine contractions, the placenta being hard and apparently thickened. Considerable hemorrhage occurred. The hemorrhage could not be controlled at first, and the pulse became very rapid and small. Momburg's bandage was applied but could not be retained, as it occasioned great suffering. The uterus was firmly tamponed, and stimulants freely given. The patient made a slow but complete recovery.

¹ Monatschrift f. Geburtshilfe und Gynäkologie, 1911, Band xxxiii, Heft 6.

In the second case, a multipara, menstruation had been interrupted for several months but the patient was not sure that she was pregnant. On examination, the uterus was enlarged to about the period of four or four and a half months, and the fetus was evidently dead. By computation the patient had gone to nearly the time of expected labor. With strong pains the patient soon after expelled the fetus, placenta, and membranes. The uterus remained relaxed and could not be brought to contract. After every means had failed, the uterus was firmly tamponed and clamp forceps applied. As hemorrhage did not cease, Momburg's bandage was used, the uterine tampon was removed, and hot uterine injections were given. This was followed by the complete cessation of bleeding. As soon as the bandage was loosened severe hemorrhage recurred. The uterus was again tamponed, when the bleeding seemed to cease. The uterus was firmly contracted and could be plainly felt. Stimulants were freely given, but the pulse was weak, and the uterus again relaxed, and hemorrhage recurred. Momburg's bandage was again applied, followed by the cessation of hemorrhage, but the patient complained bitterly of the pain which the bandage caused. After the bandage had been in position half an hour there was paresis of both lower limbs. Severe hemorrhage recurred so soon as the bandage was loosened. It was then tightened and the uterus removed through the vagina. Although stimulants were freely used the patient died soon after.

The fetus was macerated, the placenta hard, and from $1\frac{1}{2}$ to 2 cm. thick.

Upon examining the uterus, the muscular tissue was pale in color, the mucous membrane of the body and cervix somewhat eroded, and the muscular tissue very soft. Upon microscopic examination, at the placental site the entire tissue was found in a high state of degeneration. The vessels showed hyaline degeneration, so that the various coats could not be distinguished. The syncytial cells were found abundantly. The contractile elements in the uterus were lacking, and the uterus resembled a sac. It was scarcely possible to find normal vessels. The abnormal vessels extended deep in the muscular tissue, full of syncytial cells. At some points the walls of the vessels had given place to large syncytial cells. The bloodvessels of the muscular tissue showed cellular infiltration. At the placental site were found old hyaline degenerated thrombi.

Upon examining the placenta, the villi were found altered and filled with masses of blood and fibrin. Calcareous deposits were also present.

The Bacteriological and Local Treatment of Abortion Complicated by Fever. Traugott¹ reports 147 puerperal patients having fever, of whom 58 were at full term, with a mortality of 17.2 per cent.; 79 patients had

¹ Zeitschrift f. Geburtshülfe und Gynäkologie, 1911, Band lxxviii, Heft 2.

abortion in the first half of pregnancy, from the first to the fifth month. Among these, the mortality was 16.4 per cent.

Microscopic examination, in these cases of abortion, showed that, in many of them, an endometritis caused by saprophytes was present. The severity of the clinical symptoms results from the toxins produced, and persists so long as decomposing material remains in the uterus. Among the germs most often present in these cases were the colon and paracolon bacillus, staphylococci, and other bacilli. These germs, under favorable circumstances, entered the blood, but soon disappeared without producing metastases. The most favorable time for finding them in the blood was during the chill. In septic abortion, the removal of these germs from the uterus was followed by a prompt improvement.

The indication for cleansing the uterine cavity was found in the character of the germs removed and examined. In all cases treated by emptying the uterus with the finger, recovery followed.

In the 79 cases, in 45 per cent. the less virulent bacteria were found, and active treatment was indicated. Where streptococci were present the interference with the uterus was followed by the rapid development of acute sepsis, and usually by death.

Where portions of an infected ovum were present, and no indication was found at first for immediately emptying the uterus, the lochial secretion was obtained from the interior of the uterus, and examined for bacteria.

Upon the result of this examination must determine the question whether or not to proceed to empty the uterus. If saprophytic bacteria were found, the uterus was immediately emptied; if streptococci, gonococci, or staphylococci, liquefying media, or other actively infecting germs were detected, no interference was practised.

In cases where it was decided to empty the uterus after disinfecting the vagina, the finger of the hand covered by a rubber glove was used to remove the uterine contents. The external hand pressed the uterus downward and Crede's method was practised. The uterus was then lightly tamponed with xeroform gauze, and the vagina also packed. Twelve hours afterward the gauze was removed, when small particles were often found adherent to the gauze. Ergot was given to promote uterine contraction. If the cervix was closed, the effort was made to cause it to relax by the use of the vaginal tampon. If this failed, and the antiseptic laminaria tent was employed, the placental forceps and curettes were never used. The results of the treatment were good. When streptococci were detected, the patient was kept in bed and given an abundance of nourishing food. If she did not grow worse, no interference was practised. The leukocytosis was watched, and the uterus examined to determine the presence of streptococci. When these were absent or no saprophytic germs were found, the case was treated as one of mild infection by emptying the uterus with the finger and packing

it with gauze. No instrument was employed within the uterus. When hemorrhage occurred, the vagina was tamponed firmly and the patient given small doses of ergot. The spontaneous expulsion of some portion of the ovum or placenta, and the cessation of hemorrhage usually followed. If such were not the case, the vaginal tampon was continued until the cervix softened, and a strip of xeroform gauze was passed through the cervical canal. Usually the retained portion of the ovum or placenta would come away upon the gauze.

In cases in which the site of infection was not the uterus, but the tissue surrounding it, operation was not practised during the acute stage of the infection.

The mortality of cases of acute infection treated by the use of the curette in his observation was 45.5 per cent.

Fromme¹ differs somewhat from Winter and Traugott in their recommendations concerning the treatment of abortion complicated by fever. He believes that all sorts of bacteria can gain entrance to the blood so long as decomposing placental tissue remains in the uterus without producing a fatal result. He does not believe that the hemolytic streptococcus is more dangerous than other germs, nor does he believe that a prognosis can be based upon a bacteriological examination. Many of the reported cases in which severe infection developed could have been averted had placental masses been promptly removed. He would cleanse the uterus as quickly as possible when saprophytic bacteria and staphylococci were present. When streptococci are found with saprophytic characteristics he would empty the uterus as promptly as possible.

To remove placental masses, if the cervix was closed he would employ the cervical and vaginal tampon, with small doses of some preparation of ergot. The retained portion should be discharged by this treatment in twelve hours. Usually at the end of this time there is sufficient dilatation to enable the obstetrician to remove the placental tissue with the finger. If dilatation has not occurred, he would carefully open the cervix with Hegar's dilator.

In all cases he would employ the finger only for the removal of placental tissue, first irrigating the uterus with an antiseptic solution. The operator should exercise the greatest caution not to cause new wounds in the genital tract. The use of the curette he does not believe justifiable.

PITUITRIN

Fischer² gives the results of his use of pituitrin in 50 obstetric cases. He calls attention to the researches of Hochwart and Fröhlich, who, in experimenting upon animals, showed that pituitrin increased the

¹ Monatschrift f. Geburtshülfe und Gynäkologie, 1911, Band xxxiv, Heft 6.

² Zentralblatt f. Gynäkologie, 1912, No. 1.

contractile power of the muscular tissue of the bladder. In guinea-pigs the uterine muscle was also stimulated by it, and the tonic effect produced was much more pronounced than that following the administration of ergot or adrenalin.

It has long been known that an antagonism exists between the hypophysis and the ovary, as glands producing an internal secretion. Bab has drawn attention to the value of pituitrin in gynecological cases in checking uterine hemorrhage, and Neu has written concerning its value in the treatment of osteomalacia.

In Fischer's experiments, he employed 1 c.c. from $\frac{1}{10}$ gram in a moist preparation of the substance, given by subcutaneous and intramuscular injection. He did not try the remedy administered by the mouth.

In one case of abortion in a multipara, at four months, where there had been profuse hemorrhage for two days, with rise of pulse and temperature, the external os was closed and the uterus made no effort to expel its contents. Three injections, each 1 c.c. of pituitrin, given during eight hours, produced good uterine contractions, which ceased three hours after the last injection. One hour after the second injection a vaginal tampon was applied which much increased the uterine contractions. Thirteen hours after the first injection the os was dilated sufficiently to permit the introduction of two fingers and the removal by them of the ovum.

In a case of polyhydramnios at six months, the amniotic liquid was allowed to largely escape, but the external os remained closed, and uterine contractions were infrequent and very weak. One injection of pituitrin was followed by efficient pains, speedily resulting in the birth of twins.

In 2 other cases the remedy was given in the thirty-eighth week of gestation, in multiparæ, as a preliminary to Cesarean section. In both cases its action was satisfactory. In another case in which it was desired to induce labor, the remedy was without effect and the dilating bag had to be inserted. In 3 other cases of induced labor, 1 with the use of the bag in placenta prævia, the remedy seemed efficient. In another group of patients in whom the effort was made to increase uterine contractions just before the beginning of labor, no definite result could be observed.

In 30 cases, the remedy was given during labor to increase the activity of uterine contractions; 24 of these patients were in the stage of dilatation, and 6 during the period of expulsion. The dose varied from 0.5 to 1.5 c.c. An effect could be observed in from one to twenty minutes after the injection; on the average in about six minutes. The effect of the remedy lasted from two to four hours, after which time the pains seemed less frequent and weaker. The injection was again repeated, the greatest quantity used being 5 c.c. during a period of seven hours. The average injection was 1 c.c. for each case. The

effect of the remedy seemed best the further in labor the patient had proceeded before it was given. In a primipara, aged sixteen years, no effect could be observed, although the circumstances were favorable, and no explanation is given of the failure of the remedy.

As a rule, the injections were made in cases which seemed to indicate the possible use of forceps, and good results were observed. The third stage of labor in these cases lasted from ten minutes to one and a half hours—on the average twenty-seven minutes.

There was some postpartum bleeding in 9 cases, beginning just before the expulsion of the placenta. The uterus showed a tendency to relax between contractions, and clotted blood accumulated in the uterus. In 2 cases the placenta was removed by hand to check hemorrhage—in 1 case of placenta prævia, and in another where there were infarcts in the placenta. In 1 case there was postpartum hemorrhage from uterine atony after the delivery of the placenta. This was controlled by the injection of 1.5 c.c., massage of the uterus, and hot vaginal douches. It seems possible that the frequent occurrence of hemorrhage during expulsion of the placenta, in cases in which the remedy had been used, arose from some observation of the natural mechanism of placental separation.

In the case of a multipara, aged forty-three years, suffering from postpartum hemorrhage, it was necessary, in spite of injections of pituitrin, to tampon the uterus and to use Momburg's bandage. The patient was a very feeble person, with wasted and relaxed muscular tissue and atrophied uterine muscle. In the preceding labor, she had suffered from severe hemorrhage. Pituitrin was given to increase the action of the uterine muscle, but the patient bled during placental separation and it was necessary to remove the placenta. No drugs seemed to have any effect upon the uterine muscle.

In cases in which the remedy was given during labor to accelerate labor in the interests of mother or child, its action was satisfactory.

To prevent hemorrhage after labor, the remedy was given to 3 patients, who in previous parturition had suffered from severe bleeding. In all 3 patients the result was excellent, the uterus contracted well, and there was no excessive loss of blood. In some cases he believes that the combination of pituitrin with ergot or adrenalin, may be useful. In 2 cases of ischuria during the puerperal period, the results were excellent, and the patient was enabled to empty the bladder spontaneously. He observed no unfavorable effects of the remedy on mother or child. In 1 patient the pains became very active and strong, and fetal heart sounds were reduced to 60 and 80 to the minute; but the child survived its birth and seemed uninjured.

Pituitrin in Osteomalacia. Neu¹ reports the case of a multipara, aged thirty-five years, whose labors had been terminated by obstetric opera-

¹ Zentralblatt f. Gynäkologie, 1911, No. 35.

tions. The patient had suffered from frequent and excessive menstruation. The beginning of her disease dated back to the previous pregnancy, when she first noticed pain in the sacrum and pain when lying upon the back. These pains increased, with marked increase in the fatty tissues. After the birth of the child, the pains in the skeleton were so severe that the patient obtained but little rest. Breathing became difficult because of the pains in the bony walls of the thorax. The bones were excessively painful on pressure or motion. Six weeks after labor the patient could get out of bed, but still suffered from pain.

Upon examining the patient, the pelvis was becoming deformed and the bones were exceedingly painful wherever they could be pressed upon. The patient was given in all 5.5 c.c. of pituitrin, in doses varying from 0.5 to 1 c.c. by subcutaneous and intramuscular injections. No other medicinal treatment was employed, and the patient was not told what she was receiving. Improvement began after the third injection, and continued steadily until her discharge. The sternum and pelvic bones were very slightly painful on deep pressure when she left the hospital. These symptoms have since disappeared. The patient received injections of this remedy from her family physician after going home.

Jørgensen¹ has used pituitrin in 1 c.c. dose by hypodermic injection in 5 cases of labor. In 1 case the tendency already observed to bleeding during delivery of the placenta, was present. In general, the results of the remedy were prompt and satisfactory.

As a preparation for Cesarean section and to prevent uterine atony, Kroemer² has employed pituitrin, and reports his results:

His first patient was a primipara, aged twenty-four years, brought to the hospital with the history of ruptured membranes and escape of amniotic liquid. The os admitted one finger, and no fetal part could be distinctly made out.

Upon examination, the patient was found to have a considerably contracted pelvis. Under the use of pituitrin, uterine contractions increased, but the head failed to properly engage and the lower uterine segment became markedly distended. The neck of the bladder was so tightly pressed upon that a catheter could not be inserted, and the effort produced bleeding from wounds in the mucous membrane of the bladder. The occiput rotated posteriorly, meconium escaped, and the heart sounds of the child became more faint and less distinct.

Under ether, the effort was made to rotate the head and increase engagement. This was followed by the application of forceps in Walcher's position. This failed and craniotomy was performed. The extraction of the child was difficult, the uterus relaxed afterward, and severe hemorrhage occurred. Pituitrin was again given without result, but seacornin produced some improvement.

¹ Zentralblatt f. Gynäkologie, 1911, No. 37.

² Ibid., No. 39.

His next patient was a primipara, aged twenty years, with moderately contracted pelvis, scanty secretion of urine and albuminuria. The effort was made to induce labor and pituitrin was given in a considerable dose to excite pains. Uterine contractions followed but ceased after a few hours. After a quiet night the injection was again repeated, followed by uterine contractions. The patient could not take nourishment, and the secretion of urine became very scanty. He accordingly determined to terminate labor by operation. The effort was made to deliver the patient by suprasymphyseal section without opening the peritoneum. The bladder was found behind the pubis somewhat distended from long-continued pressure. After the cervix was opened in the middle line, considerable hemorrhage occurred from an artery and large vein on the right side. This was readily controlled by hemostatic forceps.

Upon opening the uterus, the head was so firmly wedged into the entrance of the pelvis that it could not be extracted with forceps blades. An application was made over the forehead, and aided by pressure, the head was extracted. The placenta was delivered without difficulty, and the tissues closed. The patient made a good recovery and was able to nurse her child.

Hofbauer¹ reports the results of his observations in Winter's clinic at Königsberg, on the use of pituitrin and digitalis together.

His experiments were made in the first and second stages of labor. He was able to conduct his observations in 66 cases. He observed that much depended, so far as the action of the remedy went, on its quality and the method of administration. Solutions which had been on hand for some time assumed a light rose color resembling adrenalin. It is thought that the use of alcohol in cleansing the needles for injection just before giving the remedy, exerted an unfavorable influence; and this was abandoned and sterile salt solution used in place.

In the first cases, the injections were subcutaneous. No unpleasant effects were observed, and the forearm and intraclavicular regions were used.

As regards the dosage, 0.5 c.c. was used in some cases, but in the last 40 cases, 1 gram. In the beginning 1 c.c. was administered, followed about ten minutes later by a second injection. As much as 3 c.c. was given in one dose without unfavorable results. In puerperal ischuria one injection of 1 c.c. was usually sufficient. When the ischuria resulted as a reflex from swelling, hemorrhoids, anal fissure, or sensitive tissue about the entrance to the vagina, the remedy did not seem to be useful.

After-effects were not observed. A few patients complained of a burning sensation at the site of injection, and some had a slight feeling of oppression followed by swelling after the injection. In no case could any unfavorable result be observed upon the puerperal period.

¹ Monatschrift f. Geburtshülfe und Gynäkologie, 1911, Band xxxiv, Heft 3.

The action of the kidneys was not interfered with. A free discharge of phosphates in the urine was noticed during a few days following labor.

The use of the remedy was limited to healthy patients. Whether it would prove injurious to those having nephritis or myocarditis has yet to be determined. Patients with goitre of moderate degree were not affected unpleasantly. The remedy was efficient in increasing uterine contractions, usually within three minutes of its administration. In some cases, uterine contractions occurred at intervals of eight or ten minutes.

There seemed to be no difference in individuals as regards the action of pituitrin. One could detect no difference between primiparæ and multiparæ. When uterine contractions were established they recurred in from one-half to three minutes. The size of the dose seemed to have much to do with the action of the remedy. As a rule, the pains continued of a good character until the termination of labor. Occasionally it was necessary to repeat the first injection, and in 3 cases only were three injections necessary. Uterine contractions varied considerably in the duration and the action of the uterine muscle.

The pains following the use of this remedy differ considerably in duration, lasting from thirty seconds to three minutes. It produced tonic contractions, which became regular and rhythmical. The uterus relaxed between the pains, as in normal cases.

It was found that the remedy had its best effect when the patient had already had a number of spontaneous contractions and when the uterus was considerably dilated. If the cervix admitted but one finger, the first effect of the remedy soon disappeared. In a case where it was endeavored to produce abortion for tubercular infection at four months, pituitrin was followed by partial dilatation, but it was necessary to complete delivery by the use of solid dilators and artificial emptying of the uterus.

During the period of expulsion the remedy acted especially well. Where there was slight pelvic contraction the birth of the child seemed expedited; where the uterus was over-distended, as by twins or polyhydramnios, the result of the remedy was good. In lateral placenta prævia, after the membranes had ruptured, pituitrin produced efficient pains and speedy delivery. In cases, however, where labor had been going on long, and where the uterus had contracted over the presenting part, pituitrin was avoided.

Hofbauer did not use it for postpartum bleeding, in the treatment of abortion, or in placenta prævia.

It was observed that fetal heart sounds became slow, but no bad effects were observed at the birth of the child. Evidently the material passes from mother to child. As a remedy for exciting uterine contractions its value seems proved.

Hofbauer also investigated the action of digitalis and its effect upon

uterine contractions. He could not observe that it had any influence in exciting uterine contractions.

In the case of a primipara where the head was engaged and the amniotic liquid previously escaped, the fetal heart sounds became better after the mother received an injection of digitalis. In 6 other cases where intra-uterine asphyxia threatened the fetus, the condition was much improved by pituitrin.

OBSTETRIC SURGERY

An interesting account of the Chamberlen's obstetric forceps is given by Ingraham.¹ He believes that to the Chamberlens should be awarded the credit of the invention of the forceps, and traces the development of the Chamberlen family.

The Chamberlens were early interested in the regulation of midwives' practice. He finds successive members of the family verging on quackery at times and taking an active interest in all sorts of measures permitted by the therapy of the day. Hugh Chamberlen, the last important member of the family, allowed the description of the obstetric forceps gradually to become known. In 1813, what were probably the original forceps invented, were found upon the estate of Dr. Peter Chamberlen. They were discovered in boxes beneath a small trap door in a cavity between the floor and ceiling. There were four instruments differing in length, one of them 13 inches long, apparently intended for application at the brim of the pelvis. It is thought by most people that the elder Peter was the originator of this instrument. As the Chamberlens were Huguenots and foreigners in England, their success and the fact that one of them was summoned to attend the queen in her confinement, must have depended upon their possession of some unusual skill or invention.

Face Presentation, Pubiotomy in. Morse² draws attention to a suggestion made by the reviewer in the *Medical News* for 1894, advising splitting of the pelvic girdle for difficult delivery in face presentation.

Among 25 pubiotomies in the obstetrical clinics of the Johns Hopkins Hospital a case of face presentation occurred which was treated by pubiotomy.

The patient was a negress, a multipara, aged twenty-four years. The pelvis was generally contracted and rachitic. She was admitted with nearly full dilatation of the cervix, chin drawn to the right side, and posterior, a contraction ring was plainly felt. The effort was made under chloroform to convert the face presentation into a vertex. This was unsuccessful because of the marked uterine contraction.

Under anesthesia, the effort was made to apply the forceps after

¹ American Journal of Obstetrics, May, 1911.

² Surgery, Gynecology, and Obstetrics, February, 1912.

partial rotation of the head, but it was not possible to rotate the chin anteriorly or to bring about descent. Accordingly, an incision about 3 cm. in length was made on the left side of the symphysis and the tissues separated from the posterior surface of the bone by the finger. A Doederlein needle was passed downward close behind the bone, the point emerging through the left labium majus. The Gigli saw was then applied and the bone severed in the usual manner. There was slight hemorrhage which was readily controlled. The forceps was then applied to the sides of the head and the chin easily rotated beneath the symphysis, and the head readily delivered. The ends of the bone gaped about 5 cm. The child was slightly asphyxiated but soon revived.

An upper incision was sutured with two layers of catgut. There was a slight tear in the left lateral wall of the vagina through which the iodoform drain was carried to the severed bone. The rest of the tear was sutured with continuous catgut. A drain was also placed in the needle hole to prevent the formation of a clot. The drains were removed on the third day, the thighs being strapped in the usual way with adhesive plaster.

The patient reacted well from the operation and emptied the urinary bladder spontaneously. Later in the puerperal period slight, but persistent incontinence of urine developed. On careful examination of the vagina, a retracted tear was found in the left sulcus in the anterior wall above the outlet. This was apparently produced at the time of delivery. By injecting a colored solution in the bladder, it was seen to merge into the vagina. This fistula healed spontaneously in about two weeks.

When the patient was discharged there was neither pain nor difficulty in locomotion. The pubiotomy wound was healed with mobility of both ends, and a definite depression over the anterior surface of the bone at the site of the incision.

But 4 other cases in which this suggestion was carried out were collected in the literature.

In 1894, Montgomery, of Quincy, Illinois, performed symphysiotomy for posterior chin presentation in a normal pelvis. The mother recovered, the child surviving delivery by forceps about thirty minutes. Although it was intended to do symphysiotomy, the pubic joint was not found, and the operation was really a pubiotomy.

The second case occurred in Leopold's clinic, reported by Kannegieser. The patient had a generally contracted pelvis with impaction of the head, the chin posterior, and formation of a contraction ring. The membranes had been ruptured thirty-five hours. Pubiotomy was done on the right side, and as the child had perished before it could be delivered, craniotomy was performed and the child easily extracted. The mother made a good recovery.

In 1910, Pankow reported 2 cases, 1 complicated by bleeding from

the operation wound, with infection during the puerperal state. The patient ultimately recovered, and her child lived. In Pankow's second case, the chin could not be brought anterior, and the child was lost through asphyxia. The mother made a good recovery.

Upon examining these cases, it is found that the operation should not be blamed for the infection of one mother, or the loss of some of the children, as the operation was not resorted to until the child was in bad condition, and the open pubiotomy which preceded infection is the more dangerous operation.

Morse believes that the indications for pubiotomy in face presentation are only cases where the pelvis is contracted and spontaneous delivery does not occur, while indications for terminating labor develop. With these patients the saw should be applied as for a pubiotomy, and an effort made to extract with forceps. If this fails, and the heart of the child is still in good condition, the bone should be severed and the child extracted.

When the chin is directed obliquely posterior an effort should be made to bring it anterior. Should this fail, and the conditions be favorable for podalic version and extraction, this may be done. If, however, the head is so deeply wedged in the pelvis that neither version nor extraction is possible, the head should be allowed to descend with the hope that anterior rotation will occur on the pelvic floor. If this does not occur, and delivery must be secured, the saw should be applied as for pubiotomy, the forceps applied to the sides of the head, and anterior rotation attempted. If this fails, the bones should be severed and anterior rotation may be brought about, and the child extracted with the chin in front. If the chin is in the hollow of the sacrum every effort should be made to secure a favorable presentation. If this fails podalic version and extraction should be done as soon as the condition of the cervix justifies. If these measures are unnecessary because the head is firmly wedged into the pelvis, primary pubiotomy should be done, the position converted into an occipital one, and the child extracted by forceps. Craniotomy should be replaced by pubiotomy in face presentation, except where the child is dead or in so critical a condition as to preclude a radical operation. Before operation is begun, the rate and regularity of the fetal heart should be observed and operation should not be undertaken unless the indications are favorable for a living child. When the true conjugate is 7.5 cm. or less, when the patient is infected, or previous attempts at delivery have been made under unfavorable circumstances, pubiotomy should be declined. As pubiotomy is done in the interests of the child, it is applicable only to those cases where the child is in good condition.

The Delivery of Complicated Cases of Impaction of the Arms in Breech Presentation. Sellheim¹ draws attention to cases where the arms are

¹ Zeitschrift f. Geburtshülfe und Gynäkologie, 1911, Band lxxiii, Heft 2.

displaced from their natural position across the chest during labor in breech presentation, and where impaction and danger to the fetus may result. These abnormalities may result from some abnormality in the child, the birth canal, or the forces of labor. Usually, however, they are the result of efforts at delivery, and as these are applied to but one portion of the fetus, while nature endeavors to expel the child as a whole, the ovoidal form of the fetal mass is lost, and the arms may easily become impacted and disturbed in their position. Traction upon the legs and breech is the most frequent cause of this complication.

Next in frequency are efforts made to artificially rotate the child during delivery. When rotation occurs spontaneously by uterine pressure, the fetal mass is not decomposed and the arms remain in their original position upon the chest.

When artificial traction is applied to the breech and the arms are lying naturally across the chest, the arm will be displaced in the direction of the greatest possible physiological movement. The arm is displaced backward and pushed up to the top of the shoulder. When the arm is at the side of the head and traction is made upon the breech, the arm again imitates the natural movement in this position and passes along the back of the fetus, sinking down to the level of the shoulder. In some cases the arm imitates the natural movement forward, and is displaced downward below the level of the shoulder. The effort thus to make traction upon the breech may result in one of three different motions: (1) A circular concentric motion of the breech, which causes the breech to move more slowly than the other portions of the fetus; (2) a longitudinal motion, which causes the fetus to rise to the height of the shoulder by progressive motion of the breech. Both motions are gliding in character, and both together tend to force the breech upward and obliquely; and (3) a motion of leverage of the breech, which is a combination of traction and rotation, causing the arm to move with relation to the head in the direction of the motion of the breech.

The combination of these motions in the axis of the birth canal is found efficient in cases of impaction of the arms. The article is illustrated by original drawings.

Combined External and Vaginal Version. Stowe¹ draws attention to the value of this procedure, reporting 5 cases during pregnancy; during the first stage of labor; 1 case of conversion of the face and occipital presentation, and 1 of version during the second stage of labor.

He finds that combined external and vaginal version was not dependent upon the size of the crevix or the degree of its effacement. Provided the membranes are unruptured, in most cases the operation is easier the

¹ American Journal of Obstetrics, October, 1910.

less the cervix is dilated. It is often impossible to correct a malposition during the later weeks of pregnancy by external methods only. In primiparæ, preliminary dilatation of the perineum and external version does not tend to interrupt gestation. In none of these cases did the fetus resume its malposition. By this procedure there is very slight danger of premature separation of the placenta. The fetal heart sounds were unaltered by the operation. A favorable presentation for the child should be obtained before labor begins. The conditions present will determine whether the operator chooses the head or the breech. The preservation of the membranes greatly facilitates the operation. Should they rupture during the first stage, version should be immediately done. The amount of amniotic liquid in the uterus, and the degree of uterine contraction determine the danger of premature placental separation. As the hand does not enter the uterus, septic infection is reduced to a minimum. The foot can be brought down to the inlet before the membranes are ruptured in some cases of placenta prævia. By this operation it is easier to secure the foot than by the Braxton-Hicks method.

Decapitation by Kezmarszky's Écraseur. Nadory¹ has used Kezmarszky's écraseur in 7 cases of transverse position of shoulder presentation. Of these mothers 4 died, 1 of acute anemia, 1 of rupture of the uterus, 1 from heart lesion, and 1 from rupture of the vagina and septic infection.

The instrument consists of a direct loop, which is passed by the left hand of the operator around the neck of the fetus, and the ends brought to a metal bar with a cross-piece terminating in a handle with a screw, which tightens the wire loop. The instrument can be readily applied by the fingers under the guidance of touch, takes little space, and has proved efficient and practical. In none of the cases reported were the wounds caused by the instrument itself. The lacerations present existed before the operation.

Hemostasis by Momburg's Bandage. Guéniot² concludes, from his review of the subject and from his experience, that the use of Momburg's bandage is well tolerated in patients having a healthy heart and vessels. When, however, either the heart or vessels are diseased, as in arteriosclerosis, accidents may follow its employment.

In using Momburg's tube, one must not forget that it is sometimes dangerous in exsanguinated women to constrict the trunk of the body without bandaging the extremities. The use of this tube is a revival of Baudelocque's method of digital compression of the aorta. As this could not be long maintained because of fatigue in the operator, the use of the Momburg bandage is in that respect an improvement.

Adair³ has investigated the use of Momburg's tube in 23 cases of parturient women. He finds that the maximum pulse rate during the

¹ Zentralblatt f. Gynäkologie, 1912, No. 6.

² L'Obstétrique, 1911, No. 1.

³ Surgery, Gynecology, and Obstetrics, February, 1912.

application of the tube, taken just before application, exceeded the normal in 21 cases. The greatest increase was 74, the least 3 beats; the average increase was 29.3 beats per minute; the average decrease 4.5 beats.

The pulse varied considerably after the removal of the tube. The increase was followed by a normal rate in most cases, after the tube had been applied for a few minutes. When the tube is removed, new channels are opened. The heart at first beats rapidly, but soon beats more slowly than normal. Respiration increases during constriction, returning to normal soon after the tube is removed. The crowding upward of the diaphragm by displacement of the abdominal organs was one of the important factors in disturbing respiration. The temperature rose during the application of the tube in most cases, but fell where the tube was applied for some time. The temperature fell in two cases after the removal of the tube, variations in temperature being slight. The blood pressure varied in different patients, there being a general rise during the application of the tube, with decrease after its removal.

Rupture of the Uterus. Wilson¹ reports the case of a multipara in spontaneous labor who was suddenly taken with cessation of uterine contractions and recession of the fetal head. She was transferred to hospital and operated upon, rupture of the uterus being present. The uterus was amputated at the cervix, the bloodvessels tied, and the rent in the vagina closed. It was thought that the tissue changes in the vagina and uterus predisposing to rupture, were present in that case. There was also undue retraction of the uterine ring, and functional fixation through adhesions of the attachments of the lower uterine segment. The vaginal attachment of the uterus was very lax, and the abdomen pendulous, causing failure of descent of the fetal head in the axis of the pelvis.

Bauereisen² reports the case of a multipara with contracted pelvis upon whom it was thought best to perform section or pubiotomy because she had had previously two difficult and unsuccessful labors. Against the advice of the staff, her husband took her away from the hospital, and four days afterward she returned with strong labor pains. There was considerable hemorrhage from the vagina. After a few hours, the uterine contractions, which were strong and painful, suddenly ceased. There was pain in the left side of the abdomen. The patient soon after was taken with vomiting and purging. The abdomen became distended and the patient passed into a condition of shock. In this state she was brought to the hospital in a dying condition. The abdomen was opened to determine the condition of the child,

¹ American Journal of Obstetrics, January, 1911.

² Archiv f. Gynäkologie, 1912, Band xevi, Heft 1.

when rupture of the uterus was found, with a macerated child, and the placenta and foul-smelling blood in the abdomen.

On autopsy, it was found that death had resulted from occlusion of the intestine caused by the pressure of the child and the placenta. Septic infection was absent.

Upon examining the uterus, rupture had occurred transversely across the lower uterine segment. On examining the uterus microscopically, it was found that its muscular tissue at the site of rupture had practically disappeared, and had been replaced by elastic tissue containing an unusual quantity of enlarged bloodvessels.

Schutze¹ reports 2 cases of *perforation of the uterus*, one by the curette and laminaria tent.

In the first case, the patient was curetted at her home for incomplete abortion, and during the operation the operator noticed that the curette extended in an unusual direction. The cervix had previously been dilated with a solid dilator. Curetting was at once suspended and the patient put to bed. A few days after fever developed, with symptoms of peritonitis, and ten days after the operation the patient noticed a bloody and foul discharge. There seemed to be a tumor either in the uterus or behind it, and the patient was transferred to hospital.

Upon examination, a mass of infiltration was found surrounding the cervix, and a foul discharge issued from the cervical canal. Under anesthesia, the cervix was dilated, when a quart of very offensive pus was discharged. It was found that the curette had perforated the posterior wall of the uterus and that a fistula had formed between the bowels and the uterus at the internal os. Fecal matter subsequently passed through the vagina. The cavity seemed to drain efficiently and the treatment was limited to vaginal douches and rest in bed. The patient made a gradual recovery, the uterus remaining retroverted, but the pelvic exudate almost entirely disappearing.

In the second case, curetting was done for abortion, followed by fever and continued hemorrhage. The curetting was repeated, when it was found that the posterior uterine wall had been perforated. Some days after this the patient again had high fever, and the attending physician, believing that portions of the ovum remained, inserted a laminaria tent for dilatation. This caused intense pain, and the effort was made to remove the tent, but the silk cord upon the tent broke and the tent disappeared in the abdominal cavity. A tenaculum forceps was introduced through the cervix in the effort to extract the tent, but a loop of intestine was grasped instead. The patient was then brought to hospital.

Upon examination, a loop of intestine was found in the vagina in a condition of beginning gangrene. As soon as possible operation was

¹ Zeitschrift f. Geburtshülfe and Gynäkologie, 1911, Band lxi, Heft 2.

undertaken, the cervical canal being severed from the internal os, followed by abdominal section. The tent was found lying at the left side of the uterus near the pelvic brim. The uterus had been perforated on its posterior aspect and two loops of strangulated small intestine had prolapsed. The opening was enlarged and the effort made to withdraw the intestine, when it was found that 10 cm. of mesentery had separated from the bowel; 12 cm. of bowel was then resected and end-to-end closure made. The rent in the uterus was also closed, the field of operation was irrigated with salt solution, and an iodoform gauze drain placed behind the uterus. The patient gradually made a good recovery.

She was afterward examined and found to be in good condition and able to do her accustomed work.

Hebostiotomy. THE RADICAL OPERATION FOR HERNIA FOLLOWING HEBOSTIOTOMY, AND THE CLOSURE OF THE BONE. Leuenberger¹ reports the case of a patient delivered by hebostiotomy, who recovered with a separation of the pubic bones of 2 cm. in width. The bones were movable upon motion, and there was some incontinence of urine. The patient also complained of pain in the sacrum, and was unable to do her work and lead her usual life.

Upon examination, it was found that the separation had come to be 3 cm. when the patient was lying down, and 6 cm. when she stood and endeavored to walk. The soft parts between the bones were so relaxed and elastic that the hand could be passed into the pelvis, and the pelvis palpated. On coughing, the contents of the abdomen protruded. The vulva gaped, and there was descent of the vagina, with retroflexion of the uterus. The x-rays showed separation of 6 cm. There was no tendency to formation of a callus.

The operator had prepared for operation an arch-shaped iron spring terminating in two fixation points, which he fixed in the sides of the pubis and endeavored to bring the two parts together. The iron spring was not strong enough to accomplish this result. An incision was made over the site of operation and the prolapsed tissues replaced in the abdomen. The effort was again made to use the iron spring, but it again proved inefficient. The patient was then turned upon her left side and a weight of 100 kilograms applied to bring the pubis together. The ends of the bone were freshened and two stitches of iron wire inserted. When pressure was relaxed there was still a separation of 0.5 cm. Strips of iodoform gauze were used for drainage, and additional sutures inserted in the periosteum to make the closure as complete as possible. The patient was placed in bed with flexed extremities, on the left side. She was kept quiet after operation by opium, but on the second night she turned upon her back. A strong compression bandage

¹ Zeitschrift f. Geburtshülfe und Gynäkologie, 1911, Band lxxviii, Heft 2.

had been applied, and the patient said that her pain was better and that she could lie quietly upon her back. Suppuration occurred in the tissues about the joint, but x-ray examination eleven days after the operation showed that union was taking place.

The patient was discharged from the hospital two months after operation with the wound healed. Twenty months after operation she was examined and it was found that the incontinence of urine had entirely ceased. The patient's power of motion was improved, although she suffered from pain in the sacrum when she worked hard.

Upon examination, there was still a separation varying from 0.5 to 1.1 cm. The right portion of the pubis was from 0.2 to 0.3 cm. farther in front than the left portion. Upon standing and walking, the two halves of the bone moved. X-ray examination showed no true bony union. On coughing and pressing downward, the right side of the vaginal wall prolapsed somewhat. The hernia had entirely disappeared, but closure in the severed bones had not taken place.

The writer describes and illustrates instruments which he has devised for this purpose and which he has tested upon the cadaver.

Roth reported, before the Gynecological Society of Dresden,¹ 85 hebostiotomies. The method was the subcutaneous. The maternal mortality was 2.35 per cent.; the fetal mortality was 7 per cent.; the conjugata vera in these cases was between $6\frac{1}{4}$ and 8 cm.

In 13 cases there was profuse hemorrhage; in 3, the hemorrhage was alarming; but in every case bleeding was checked by compression. One patient collapsed at the close of the operation, and it was thought that hemorrhage had occurred within the pelvis. This patient made a slow recovery. In 15 cases severe lacerations of the soft parts occurred, or 17.6 per cent. communicating with the bony tissue; 10 of these, or 29.4 per cent., occurred in primiparæ; 5 or 9.8 per cent., in multiparæ. In one patient in her fourth labor, laceration of the vagina occurred, communicating with the bone so soon as the bone was severed, and before the child was delivered. In 6 cases the bladder was injured—in all, in 14 per cent.—and, of these, injury was more frequent with primiparæ. These complications did not, however, prove severe. One case had severe injury of the iliosacral joint with thrombophlebitis of the pelvic vessels, and death from sepsis. There was great disproportion between the head and pelvis, and autopsy showed separation, and pus formation in both iliosacral joints. In a few cases, less severe injury to these joints was present.

The morbidity of this series was high; 56.5 per cent. had fever during the puerperal period, and 23.5 per cent. had high fever. Collections of blood which formed seemed to do no harm, but retention of the lochia was not unusual; 14 cases suffered from thrombosis.

¹ Zentralblatt f. Gynäkologie, 1911, No. 9.

Thirty-eight patients, on whom 40 hebostiotomies had been performed, were examined afterward, 10 complained of interference with walking and could not do their usual work; 9 of these returned with disability in the iliosacral joints. In these cases, the disproportion between the head and pelvis had been very great. In 21 out of 38 patients, there was more or less prolapse of the uterus and vagina, and among these were 7 young primiparous women.

In 20 women who had had the operation, the opportunity arose to observe labor after the operation. In but 6 of these cases did the previous operation seem to have done any good. In the remainder, the pelvis had not been permanently enlarged. The mortality of the children in confinements succeeding hebostiotomy was 18 per cent.

The result of these cases had caused the abandonment of hebostiotomy in the Dresden clinic in primiparous patients, and also in infected cases, and in women in bad condition.

The field of indication for this operation is a limited one, and Cesarean section should be chosen where there is great disproportion between mother and child.

Christofelletti¹ reports the case of a patient who had been delivered by hebostiotomy and suffered afterward from a vesicovaginal fistula. Two operations were performed without success, when the patient became pregnant. At term she was delivered by Cesarean section, and eight weeks later the bladder was separated from the pubic bone and the vesicovaginal fistula closed. A defect in the wall of the bladder the size of a half-dollar was found at the operation. This had resulted from the operation of hebostiotomy. Two other cases are reported of incontinence of the bladder after hebostiotomy, without fistula. In these, the bladder was dissected away from the posterior wall of the pubis and the tissues brought together, when the incontinence ceased.

Harrbleicher² publishes notes of 16 unselected cases of hebostiotomy from the clinics of Bumm, Franz, Doederlein and Winter.

In the hands of an expert, and with a selected case, the operation proceeded smoothly and successfully. Its field should be limited to multiparæ with a true conjugate of not less than 7 to 7.5 cm. in flat, or 8 cm. in generally contracted pelves, where engagement has already occurred and it is evident that very little increase in pelvic measurements is necessary to permit the head to pass. Mother and child must be in good condition.

When one considers the high morbidity following this operation, the difficulty in walking and working afterward, the failure of the severed bones to firmly unite, the tendency to laceration, and the severe hemorrhage—one would hesitate to give this operation the preference over Cesarean section.

¹ Zentralblatt f. Gynäkologie, 1911, No. 8.

² Journal of Obstetrics and Gynecology of the British Empire, March, 1911.

Mayer¹ believes, in practising hebostiotomy, the tendency to separation of the pelvis will be limited if the patient be put in Walcher's position, with the legs brought as closely together as possible when the bone is severed. The legs are then raised up carefully to permit the expulsion of the child.

Costa² describes, with illustrations, the technique of *pubiotomy* in Mangiagalli's clinic in Milan. After shaving and disinfection, the patient is placed in Walcher's position. The open method is then followed by direct incision, and the bone separated under the guidance of the gloved hand. After the operation, the wound is carefully and completely closed.

Freeland³ reports 9 pubiotomies at the Rotunda Hospital. The first 5 were done by Doederlein's semi-open method; the last 4 by Bumm's subcutaneous method. The latter is considered more simple and less liable to complications. After the operation, the pelvis was supported by a broad canvas belt, 8 inches wide, with three straps firmly applied around the pelvis outside the binder. The patient was kept on her back for twenty-four hours, then moved from side to side until the third day, when the bowels were moved. After this the patients were allowed to move freely.

The after-history of these cases has been followed, and none of them report disability. In 2 cases there was hemorrhage and laceration at the operation, but these also made good recoveries. Five women have been delivered since the operation, 4 with spontaneous, easy labors; 1 patient had too great a degree of pelvic contraction to justify repeated pubiotomy, and she was delivered by extraperitoneal Cesarean section. X-ray pictures showed that 3 patients had bony union, 2 fibrous union, and in 2 it could not be ascertained what sort of union would result.

Bovis⁴ does not believe that a permanent enlargement of the pelvis occurs after pubiotomy. He does not believe in severing the bone in the usual manner, but would perform osteotomy along the internal border of the pubis toward the ischium. In 10 cases he has thus avoided hemorrhage and complication from laceration.

Blos,⁵ in performing hebostiotomy, would make an incision above the symphysis parallel to Poupart's ligament. He would resect the pubis subperiosteally as one might resect a rib. By applying pressure upon the ischium above the trochanters he would limit the separation at the time of the operation.

Van de Velde⁶ reports 40 cases of hebostiotomy, with 1 death from

¹ Zentralblatt f. Gynäkologie, 1911, No. 3.

² Annali di Ostetricia, 1911, No. 5.

³ Journal of Obstetrics and Gynecology of the British Empire, June, 1911.

⁴ L'Obstétrique, 1911, No. 4.

⁵ Zentralblatt f. Gynäkologie, 1911, No. 43.

⁶ L'Obstétrique, 1911, No. 10.

bilateral renal tuberculosis. He observed no bad effects in the case of the child, but 1 mother had urinary fistula opening at the mouth of the urethral orifice. He practised lateral perineotomy to diminish the risk of laceration in the neighborhood of the bladder. One case was complicated by hematoma, which disappeared spontaneously. Thrombosis occurred in 3 patients, in 2 on one side only; in a third, on both sides. In 9, out of 14 cases, the pelvis remained permanently enlarged. In 125 cases which he has collected from the literature, the pelvis was enlarged in 74; in 10 cases of his own, and others, the permanent result of the operation was doubtful. In his observation, 7 patients had borne children after the operation, there being among them 12 spontaneous labors. One patient who had refused hebostiotomy the second time and also Cesarean section, was delivered by craniotomy.

In the cases collected, there were 55 births of infants at term after the operation, with 65 women; 47 women had 62 labors terminating spontaneously; 21 women had 23 major operations performed in subsequent pregnancy.

He recognizes fully the complications which develop after the operation and the interference with the patient's power of motion and with her general health.

Cesarean Section. CELIOHYSTEROTOMY (CLASSIC CESAREAN SECTION). Pearson¹ reports 4 celiohysterotomies. The first was complicated by a large fibroid, and operation terminated in supravaginal hysterectomy; the second was done for contracted pelvis; the third for pelvis of the male type, the patient having lost a child in a previous difficult birth and having sustained a severe laceration. After her recovery from Cesarean delivery, the laceration was repaired, with excellent results. The fourth case was complicated by a cystic tumor of the right ovary which had become impacted.

All of these cases terminated successfully for mother and child, without complications. In 3 of the cases, operation was performed before the onset of labor. It was intended to do this in the last, but the membranes ruptured prematurely.

CESAREAN SECTION FOR DYSTOCIA FROM VENTROFIXATION. Ferguson² reports the case of a patient who had two living children in spontaneous birth, but who suffered from laceration and displacement of the uterus. For the latter, ventrofixation was performed. During the next pregnancy she suffered from nausea, vomiting, and pain during the early months.

She came into labor at about term with strong pains and rupture of the membranes. The os was partly dilated above the promontory of the sacrum and pointing directly backward at the fourth lumbar vertebra. An attempt was made under anesthesia to pull the anterior

¹ British Medical Journal, March 2, 1912.

² Journal of the American Medical Association, February 17, 1912.

lip of the cervix forward and bring the uterus in the axis of the birth canal. Podalic version was undertaken, but this was impossible because of a contraction ring encircling the uterus at the point of fixation. As the pains became excessively strong and threatened uterine rupture, the patient was delivered by section.

At operation, the extraction of the head was delayed by the contraction ring, which grasped it below the chin, and it was necessary to extend the incision into the adherent band formed by the ventrofixation.

Mother and child made a good recovery.

The reviewer has lately performed celiohysterotomy for previous ventrofixation. The patient had borne one child and did not give a clear history of her previous health. She was sent to the Jefferson Maternity by the physician who examined her in labor, as a loop of cord had prolapsed, but nothing definite could be ascertained concerning the condition of the uterus or abdomen.

On admission, uterine contractions were vigorous and threatened rupture. The loop of cord was within the vagina, the os was above the promontory of the sacrum, and the breech could be indistinctly felt. Heart sounds could be heard. A large tumor, apparently uterine, lay above the pelvic brim, much broader than normal. On the left side, over the left broad ligament, was the scar of an abdominal incision. Upon opening the abdomen, beneath the scar was found a firm fixation band two fingers in breadth. The anterior uterine wall had developed but slightly and had been drawn in to form a pouch or pocket at the pelvic brim. The posterior wall of the uterus and the fundus had dilated to accommodate the fetus. In this portion of the uterus, the wall was an inch and a half thick. The constriction band was first severed and the uterus turned out from the abdomen, when it was found that at the point occupied by the head and shoulder the uterine wall had become greatly distended and threatened rupture. The uterus was incised, and the child and appendages extracted, and celiohysterectomy performed.

The left ovary was missing. The child speedily revived, and was a male of average development.

In 110 Cesarean sections, this is the third which the reviewer has seen where distortion of the uterus and dystocia followed ventrosuspension.

CESAREAN SECTION AND ITS ALTERNATIVES IN SUSPECTED AND SEPTIC CASES. Peterson¹ believes that, in cases of undoubted sepsis, the child should be sacrificed without hesitation in the interests of the mother. Embryotomy is often the operation of choice in these cases, and Cesarean section should frequently be declined.

¹ American Journal of Obstetrics, February, 1912.

In cases of probable infection, without fever and without foul vaginal discharge, the choice will lie between supravaginal amputation with burying the cauterized stump, panhysterectomy, or extraperitoneal section. He would prefer celiohysterectomy with dropping the cauterized stump.

The third class are cases of possible infection, with a history of rupture of the membranes with no examinations, or unruptured membranes with repeated examinations without attempts at delivery and without fever or foul vaginal discharge. The classic Cesarean section is permissible here with extra precautions to prevent infection of the abdominal cavity.

TAMPONING THE UTERUS IN CESAREAN SECTION. Vicarelli¹ urges the value of tamponing the uterus with sterile or antiseptic gauze in performing the classic Cesarean section. He believes that this procedure prevents relaxation and hemorrhage, aids the prompt discharge of the lochia, and stimulates the uterus to contraction. He appends the tabulated report of 34 cases, showing excellent results.

The reviewer has for some time practised the tamponing of the uterus with 10 per cent. iodoform gauze in celiohysterotomy in suspected cases, when the patient has been long in labor with ruptured membranes, or when the membranes have not ruptured, but there have been repeated examinations by persons whose asepsis was not known. In cases in which the uterus did not vigorously contract, this procedure has proved useful. If necessary, the cervix is sufficiently dilated by the fingers passed from above to permit the easy extraction of the gauze. After the operation, the vagina is thoroughly cleansed with cotton dipped in bichloride solution and tamponed with bichloride gauze. The gauze is removed in from forty-eight to sixty hours.

Uniformly good results have followed this practice.

Burns² reports 18 celiohysterotomies, with removal of the uterus from the abdominal cavity before the extraction of the child. He also reports 11 cases in which the uterus was not removed from the abdomen.

These operations were performed for contracted pelvis, obstructing tumors, eclampsia, previous attempts at delivery with infection, and atresia. The results for the mothers were uniformly good.

Prince³ reports 11 Cesarean sections, with good results for 10 of the mothers, and the recovery of 10 of the children. One case had high temperature with a high leukocyte count during pregnancy, and at the operation a quantity of pus was liberated, followed by removal of the uterus. One patient died after eclampsia, and one delivered during eclampsia made a good recovery, although severely ill afterward. In

¹ *Annali di Ostetricia*, 1911, No. 4.

² *Journal of the American Medical Association*, January 13, 1912.

³ *Surgery, Gynecology, and Obstetrics*, January, 1912.

one case there was hernia of the uterus, with albuminuria, the patient improving rapidly after the operation.

In these operations the abdomen was prepared by shaving and cleansing the skin with ether when the patient was upon the table, followed by tincture of iodine. It is thought that operation at eight and one-half months gives fully as good results for mother and child as the later operation. The earlier operation has the advantage of sparing the woman the suffering from labor, and giving the operator abundant opportunity for thorough preparation.

Matthaei¹ reports the case of a primipara who, at eight months, had severe nephritis. Complete blindness developed, for which ophthalmic examination showed no cause in the tissues of the eye. Cesarean section was chosen as the most prompt and simple method for rapid delivery.

Upon opening the abdomen, about six quarts of ascitic fluid escaped. The patient immediately improved after the operation, with complete recovery of sight. The child did well.

Beckmann² reports the case of a primipara, aged twenty-two years, admitted to hospital in strong labor pains, normal pelvis, and ruptured membranes. The head of the child could be felt above the pelvic brim. An immovable tumor occupied the pelvic cavity. The child was delivered by section with transverse fundal incision, and the tumor, which proved to be a dermoid which had undergone suppuration in its contents, was removed. Mother and child made a good recovery.

This case illustrates the uncertainty and danger of attempting to lessen the size of an ovarian tumor by puncture when the tumor complicates labor. Had the attempt been made in this case, it must have resulted in the discharge of pus into the pelvic or abdominal cavity.

THE SUPERIORITY OF CESAREAN SECTION OVER OTHER METHODS OF DELIVERY. Leopold³ sums up his experience with the classic Cesarean section, hebostiotomy, and extraperitoneal Cesarean section. He concludes that classic Cesarean section can be appropriately performed with mother and child in good condition, whether the mother be primipara or multipara, for conditions requiring prompt delivery, and for contracted pelvis with true conjugate of less than 8 cm.

His results give a maternal mortality of 1.2 per cent., a fetal mortality of *nil*.

The Porro operation he has performed where the mother was infected, the child dead or dying, the true conjugate less than 7 cm., and at any stage of labor. His results have been no mortality for the mother, and, in cases where the child was living at the time of operation, a fetal mortality of between 5 and 6 per cent.

Hebostiotomy is limited to the interests of the child, and in con-

¹ Zentralblatt f. Gynäkologie, 1911, No. 49.

² Ibid., No. 4.

³ Ibid., No. 9.

tracted pelvis may be chosen with a true conjugate from 8 to $6\frac{3}{4}$ cm. The mother must be free from infection and multiparous. The maternal mortality in his cases was 1.2 per cent.; the fetal mortality from 6 to 8 per cent.

His results with extraperitoneal Cesarean section were not encouraging. He performed the operation for contracted pelvis with true conjugate less than 8 cm., and in cases where maternal infection was present or was suspected. The maternal mortality was 7 to 8 per cent.; the mortality of the child 8 per cent. He is firmly convinced of the superiority of the classic section.

In the *Zentralblatt f. Gynäkologie*, 1911, No. 12, Leopold reported his experience in suspected cases upon whom he performed Cesarean section. It was his custom before operating to examine the secretion from the urethra, the vagina, and the cervix, to determine the presence of gonococci or other harmful bacteria. If gonococci were found in abundance, and the indications for Cesarean section were present, the operation was performed with good results. The uterus and abdominal walls were not infected in these cases, as the bacteria had not gone beyond the internal os, and it was thought that infection had occurred during pregnancy.

In other cases, in which the patient was suffering from latent gonorrheal endometritis, she must be considered as already infected, and an exact diagnosis is often difficult.

He reports the case of a multipara with contracted pelvis in whose urethral secretion he failed to find pathogenic bacteria. The operation proceeded smoothly, the child being in good condition. The fourth day after the operation the patient had fever, with some abdominal tenderness and pain over the right uterine cornu. Upon examination, the lochia was scant but clean, and there was no exudate upon the cervix; typical gonococci could not be found. The uterus was irrigated with sterile water. On the eighth day after operation, the uterus was at the umbilicus, and some of the stitches were removed from the abdominal wall. The patient continued to have moderate fever. On the tenth day the uterus had not grown smaller, the lochia was foul, and gonococci were found in the secretions of the urethra and vagina. On the sixteenth day, an abscess was discovered at the middle of the incision, which was opened, the pus containing abundant gonococci. As the fever still persisted on the twenty-fourth day the incision was opened, and an abscess found at the fundus of the uterus which included four of the silk stitches closing the uterus. These were removed and the cavity cleansed. The fever subsided, the fistula closed, and the patient made a good recovery.

IMPROVEMENT IN CESAREAN SECTION. Veit¹ makes his incision in the linea alba when opening the abdomen. The incision is made at

¹ *Zentralblatt f. Gynäkologie*, 1911, No. 16.

such a point that the umbilicus is at the centre of the incision. The abdominal wound is then covered with sterile material, clamped to the peritoneum, and the lower and upper ends of the wound covered by metal specula. The uterus is removed and then opened, the patient in the Trendelenburg posture, the fundus of the uterus extending to the epigastrium. The abdominal surface is covered with sterile towels which are sufficiently rough to hinder the slipping of the uterus back into the abdomen. The anterior wall of the uterus is covered with sterile gauze and the abdominal cavity completely shut off. The uterus is opened by transverse incision at the fundus so that the child practically falls out toward the upper portion of the mother's body. The placenta is readily delivered and all the uterine contents proceeds over the patient's breast and away from the abdomen. The uterus is closed, precautions being taken to absolutely control hemorrhage. The uterus is then raised perpendicularly and thoroughly cleansed with sterile gauze and replaced in the abdominal cavity. The abdominal wound is closed after repeated disinfection.

If the operator prefers to perform the operation with the patient in the horizontal position, the fundus of the uterus is directed over the mother's thigh, which is covered by sterile towels. Every precaution is taken to keep the uterine contents out of the abdominal cavity.

CESAREAN SECTION FOR PELVIC TUMOR. Hesselbach¹ reports the case of a primipara in labor for some time without progress, the pelvic cavity being obstructed by the tumor. An attempt was made, under anesthesia, to push the tumor up into the abdominal cavity, but this failed. Upon opening the abdomen, blood-stained ascitic fluid was present. The uterus was emptied in the usual manner, the tumor removed from behind the uterus, and the pedicle ligated without difficulty. Both mother and child made a good recovery.

The tumor was a solid cylinder-celled carcinoma of the right ovary. Two and a quarter years after the operation the patient remained in excellent health.

Reich² reports a case of adherent ovarian dermoid complicating pregnancy where labor was terminated by Cesarean section, with the removal of the tumor, in Ehrendorfer's clinic at Innsbruck. Mother and child made excellent recoveries.

THE TECHNIQUE OF CESAREAN SECTION. Henkel³ does not believe that the morbidity and mortality of the extraperitoneal Cesarean section in clean cases is better than that of the classic operation, but, on the contrary, worse. The frequency of wounds of the bladder, and the disturbance of the connective tissue of the pelvis, causes suppuration in 25 per cent. of cases where this accident occurs. Phlegmonous inflammation is a frequent result. Abnormal fixation of the cervix in

¹ Zentralblatt f. Gynäkologie, 1911, No. 17.

² Ibid., No. 20.

³ Ibid., No. 27.

the anterior abdominal wall may be an unpleasant consequence, and dislocation of the bladder may cause the patient considerable distress. The mortality rate of the child is also greater than that by the classic operation.

He would limit this method to opening the cervix only, if possible, and not endeavor to open the body of the uterus extraperitoneally. He believes that it has been demonstrated by experience that the peritoneum is less susceptible of infection than the connective tissue of the pelvis, and that unless the uterus is removed from the abdomen the difficulty of extracting the child is also an argument against the effort at extraperitoneal section; and the same applied to the removal of the placenta. He believes that the peritoneum should be opened transversely in the extraperitoneal method, and considers this of great importance. He has, by this method, 25 cases without mortality, although some of them were undoubtedly infected before operation.

CESAREAN SECTION FOR PLACENTA PRÆVIA. Scipiadès¹ reports 14 per cent. mortality from central placenta prævia for mothers, and 83.5 per cent. for children, in the clinic at Budapest. He has endeavored to reduce this by Cesarean section, and reports 3 cases.

The first was a primipara, aged thirty-five years, at term, admitted to the hospital after one very severe hemorrhage. The cervix was undilated. The patient was kept under observation for five days, with slight hemorrhage for two days, and for three days none. On the fifth day labor pains began with hemorrhage. At first the bleeding grew somewhat less, but after a few hours a second and more severe hemorrhage occurred. Braun's dilating bag was introduced and the patient was operated upon by Cesarean section. The placenta was readily removed, the uterus packed with gauze, the end of which was carried into the vagina. The patient's recovery was complicated by mastitis on the twenty-first day. She and her child ultimately made a complete recovery.

The second patient was aged thirty-eight years, and had had an abortion fourteen years previously. The present pregnancy was complicated by hemorrhage, which recurred and was severe.

Upon admission, the patient was very pale, with a pulse of 96. The child was living and apparently large. The upper third of the vagina showed a circular contracted area. The cervix was undilated. The mother was very desirous of a living child and readily consented to operation.

Upon section, the placenta was found covering the os, and the uterine wall was filled with small fibroid nodules. The uterus did not contract promptly and the operation was terminated by hysterectomy. Mother and child made a good recovery.

¹ Zentralblatt f. Gynäkologie, 1911, No. 41.

The third patient was a multipara, aged forty years, who four days previously had severe hemorrhage, followed by daily bleeding. The attending physician had applied the tampon and sent the patient to hospital.

Upon admission, the patient was profoundly anemic, at full term, and the fetus dead. The cervix was little dilated and resistant. As the patient did not desire more children, labor was terminated by hysterectomy. It was necessary to operate as rapidly as possible, and to use all possible measures of stimulation. Although the patient's condition was most critical, she steadily improved and finally made a good recovery.

Asa B. Davis¹ reports 104 Cesarean operations during about ten year's time. The abdominal incision was made in the median line, about 10 cm. long, around the left side of the umbilicus, above and below. In succeeding operations, the incision was carried entirely above the umbilicus. The uterus was opened in the abdominal cavity, an assistant making pressure with the hands against the abdominal walls, rotating the uterus so that its anterior wall looked directly forward and holding the uterus up to the abdominal opening so that the uterine contents did not escape into the abdomen. The operator hooked two fingers of the left hand into the uterus at the upper angle of the wound, and with the right hand emptied the uterus completely. The suture of No. 3 chromic gut was passed through the uterine muscle at each angle of the wound and tied. The first assistant ceased abdominal pressure and held the uterus up in the abdominal opening by these sutures. The uterus was then closed and placed in its accustomed position in the abdomen. The head of the bed was elevated to allow descent of the uterus and to favor drainage. Uterine hemorrhage was controlled from a large sinus by holding a large pad over the bleeding point. The pressure of the wrist during the removal of the membranes helps to check hemorrhage, and the pulling of the uterus, which makes pressure upon the uterine sinuses. If there is much hemorrhage after delivery, the placental site may be temporarily packed. The patient is usually allowed to get up on the eighth day, and is discharged from the hospital about the twelfth day.

The 104 operations were done on 89 women, with a maternal mortality of 16.83 per cent., and the children of 6.6 per cent. stillborn; and 11.11 per cent. subsequently died in the hospital. The total infant mortality was 17.92 per cent., including 10 cases, 5 of which were septic, and 5 moribund; the maternal mortality was 5.32 per cent.

When cases are under observation, it is thought best to wait for the beginning of labor so as to secure as mature a fetus as possible. In eclampsia, labor was not present and many were not at term, but no

¹ Bulletin of Lying-In Hospital of New York, June, 1911.

dilatation of the cervix was practiced, and there was no difficulty with uterine drainage.

There is no objection to operating in all cases before labor if the pregnancy has been sufficiently under observation to be sure that the child is mature.

In addition to the usual indications for Cesarean section, the writer believes that a large proportion of eclampsias are best delivered in this way, and that in hospital well-marked cases of placenta prævia should so be delivered. Children with large, non-moulding heads and monstrosities, making delivery difficult, are also a sufficient cause for the operation. On comparison with forceps, podalic version, forcible delivery, and pubiotomy, Cesarean section is the better operation.

Purslow¹ reports 10 Cesarean operations at the Queen's Hospital in Birmingham, with the recovery of all the mothers, and 9 of the children born living.

In a case in which the child was dead, the mother had been in labor many hours, forceps had been tried, unsuccessfully, and the cord was prolapsed and pulselses. Section was chosen rather than craniotomy, because the head was high above the pelvic brim and the uterus in tetanus with threatened rupture. Upon examining the uterus, rupture had already begun on the right lateral aspect.

Of the children born living, 2 died in the hospital, one on the day of its birth, the other twenty-three days afterward from diarrhea and vomiting.

Operation is performed before labor, although care must be taken not to operate prematurely.

Rubeske² reports his experience in Cesarean section at the obstetric clinic of Prague.

In the last sixteen years, 42 sections were done; 39 celiohysterotomies, 3 cervical or suprasymphyseal; 4 mothers died.

Rubeske distinguishes between classic section of the body of the uterus and the cervical or suprasymphyseal section. In the former, if the uterus is aseptic, the maternal mortality is about 5 per cent., rising in infected cases to 10 per cent. In cervical section, the maternal mortality is 4.4 per cent.

The classic section is indicated where the uterus is aseptic and the true conjugate under 6 cm., or where there is some essential hindrance to birth. In osteomalacia, hysterectomy and removal of the ovaries is indicated. In stenosis of the cervix and vagina, amputation of the uterus is indicated, and in carcinoma of the cervix, radical extirpation, if possible. This operation also is chosen in myoma of the cervix and when the uterus is infected. Cervical incision is thought to give better prognosis, but cannot be performed until the end of the first

¹ British Medical Journal, July 8, 1911.

² Wiener klin. Rundschau, 1911, Nos. 15, 16, 17, and 18.

stage of labor. The extraperitoneal method is chosen when infection is suspected.

If Sellheim's method be selected, the peritoneum is freed from the anterior wall of the bladder as high as possible and divided, and then from the anterior wall of the uterus, the two parallel edges being stitched together to shut off the peritoneal cavity before the uterus is opened.

If Latzko's method be selected, the bladder is drawn strongly to one side of the peritoneum and freed from the bladder and uterus. In septic cases, Sellheim's seems the better method.

Holland¹ reports the case of a multipara in labor at term for twenty-five hours, the arm and leg of the child presenting. Under anesthesia, version was attempted unsuccessfully. Uterine rupture threatened, and on admission to hospital the arm was amputated and version again attempted without success. As the head could not be felt through the cervix, and the abdomen was high up, embryotomy could not be performed, and Cesarean section was chosen.

Upon opening the uterus, the child remained firmly gripped and could not be extracted. The inguinal region of the fetus was opened and the liver and intestines removed, when the breech was extracted, followed by the head.

During convalescence the lower part of the abdominal wound suppurated, and on the twenty-eighth day thrombophlebitis of the left femoral vein developed. The patient made a tedious recovery.

The second case was a multipara on whom labor was induced four weeks before term because of contracted pelvis. A shoulder presentation developed and an unsuccessful attempt was made to dilate the uterus with the hand, followed by the introduction of a bag.

Upon admission to hospital, the uterus was tetanic, with a well-developed contraction ring. An arm had prolapsed, around which the internal os was tightly contracted. Upon opening the uterus, it was necessary to open the fetal chest and remove its contents before extraction could be attempted. The contraction ring was strongly developed. A portion of each Fallopian tube was excised to prevent further-conception. The patient made a good recovery.

The reviewer has recently had occasion to perform section for shoulder presentation, prolapsed arm, and threatened uterine rupture. The extraction of the fetus was difficult after section, but was accomplished without embryotomy.

As the case had been long in labor, under doubtful care, it was considered infected, and the Porro operation performed. The patient's recovery was uncomplicated.

The risk taken by the writer in not draining or removing the uterus

¹ Journal of Obstetrics and Gynecology of the British Empire, June, 1911.

in these cases which he reports, was a very great one, and one which we would hesitate to assume.

Wyatt¹ performed Cesarean section under spinal anesthesia for enlarged and degenerated heart with beginning edema of the lungs; 1.6 c.c. of tropococaine with adrenalin was injected between the second and third lumbar vertebræ, the skin having been previously cocaineized, and within ten minutes there was complete anesthesia from the sub-costal line downward.

The operation was performed in the usual manner, followed by the removal of a piece of each Fallopian tube. During the operation the patient vomited several times, but reacted well, and did well for three days. On the fourth day heart failure supervened, and she died five days after the operation.

At autopsy, there was marked stenosis of the mitral valve, with sclerosis and incompetence of the aortic. The Cesarean wound was firmly closed and uninfected.

Manton² performed Cesarean section because labor was impossible from a pelvic tumor, which at operation was found to be an impacted dermoid. The patient's convalescence was complicated by mild phlebitis in the left leg.

Humpstone³ reports 25 Cesarean sections, with no maternal or fetal mortality; 6 of the operations were performed before labor. The indications were dystocia for ventral fixation in 5 cases; funnel pelvis with scar tissue in the vagina in 1; stenosis of the vagina in 1; impacted cyst in one; prolapse of the cord with contracted pelvis in 3; bony tumor of the pelvis in 1; generally contracted pelvis after the test of labor in 9; funnel pelvis in 1; and flat, rachitic pelvis in 3.

Of the 5 ventral fixation cases, 3 followed operation by one man. His method consisted in suturing the fundus and posterior wall of the uterus firmly to the fascia, muscle, and peritoneum just above the pubes. The other 2 cases were accidental fixation in operations intended to be suspensory only. Of the operations, 24 were celiohysterotomy, with sterilization in 2; and celiohysterectomy in one.

CESAREAN SECTION IN THE UNITED KINGDOM. Routh⁴ has tabulated 1282 cases of Cesarean section by over 100 operators in the United Kingdom, and reviews the state of the operation in the hands of the British obstetricians.

He reviews the alternatives for Cesarean section, and states that, in 1866 Playfair, quoted the mortality of Cesarean section at 89 per cent.

At this time, Spencer Wells' mortality after ovariectomy was 28 per cent., which was reduced to 11 per cent. in 1882. With improvements in surgery, the mortality of Cesarean section has steadily decreased.

¹ Journal of Obstetrics and Gynecology of the British Empire, August, 1911.

² American Journal of Obstetrics, June, 1911.

³ Ibid., May, 1911.

⁴ Journal of Obstetrics and Gynecology of the British Empire, January, 1911.

In 1884, the Porro operation was extensively employed, and in 1889 celiohysterotomy was strongly recommended by Champneys. In 1891, Cameron reported 10 consecutive cases, with 9 recoveries.

It is estimated that at present Cesarean section by British operators for contracted pelvis, under favorable circumstances, has a maternal mortality of 2.9 per cent., with very little morbidity. It is estimated that the saving of fetal life by the adoption of the operation has been 36 per cent.

In dealing with septic cases, mention is made of prophylactic irrigation of the amniotic cavity by normal salt solution at 100° F. It is thought that the uterus should be turned out of the abdomen, and the abdominal cavity carefully protected in these cases. It is also suggested that possibly a bacteriological examination could be made and a verdict given within half an hour during operation, which might decide the question of removing or retaining the uterus.

As regards sterilization, the method most employed is the removal of the Fallopian tubes in whole or in part.

The induction of labor is favored in contracted pelvises in cases seen early enough without excessive contraction—the thirty-fifth and thirty-sixth weeks being the times usually selected. In patients seen at full term or in labor, with contracted pelvises, where no attempts have been made to deliver, celiohysterotomy would be preferred to pubiotomy or symphysiotomy. In suspected cases, probably infected, celiohysterotomy would be chosen if the pelvis was highly contracted; if not, the choice would lie between celiohysterectomy and craniotomy. Pubiotomy, symphysiotomy, and extraperitoneal section are not considered desirable.

It is recognized that delivery by section may be desirable in cases of stenosis, and in cases where labor is complicated by pelvic or abdominal tumors.

In separation of the normally implanted placenta, Cesarean section is justifiable in the interests of the mother, with hysterectomy if the uterus does not contract. Vaginal Cesarean section is not favored.

In placenta prævia, the mother and child in good condition, and with rigid undilatable os, and free hemorrhage, Cesarean section may be chosen.

In eclampsia, abdominal Cesarean section is justifiable only with undilatable cervix, and the failure of other methods of treatment. Vaginal Cesarean section is not considered a desirable operation.

In the *Journal of Obstetrics and Gynecology of the British Empire*, February, 1911, Routh considers more in detail the question of Cesarean section in suspected cases. His conclusions are essentially those already stated.

Cesarean section in non-contracted pelvis was performed three times

by Simpson.¹ In one patient, labor was complicated by a large ovarian cyst. In a second case there was a double uterus, with a rudimentary third ovary and tube. There was also a second complete vagina. The third patient was a primipara over forty years of age, with central placenta prævia.

The 3 cases resulted in the recovery of the mothers and children.

REPEATED CESAREAN SECTION. McGibbon² reported the case of a patient in whom 3 successful Cesarean sections were performed. At the last two operations there were no adhesions, and little sign of scar in the uterine wall. At the third operation sterilization was performed.

POSTMORTEM CESAREAN SECTION. Stern³ performed postmortem section on a patient dying from nephritis and heart failure. He was successful in saving the life of the child. The operation was performed almost immediately upon the mother's death.

The reviewer has twice operated upon the dead and dying to save the life of the child. In one case in which the mother died from eclampsia, the child lived two weeks, then perished from hepatic toxemia.

In another case in which the child was delivered while the mother was moribund, respirations having ceased, but a faint heart beat persisting, the child survived. The fate of the children in these cases will depend upon the degree of maternal toxemia present. The most favorable cases for the saving of infant life are those of severe maternal heart lesions where compensation is suddenly lost, although the mother has been in fairly good health before labor.

RUPTURE OF THE SCAR AFTER CESAREAN SECTION. Vogt⁴ tabulates 22 cases of rupture of the scar following Cesarean section, and 13 fetal deaths.

The treatment of the cases was equally divided between suture of the rent, celiohysterectomy, and the Porro operation, with one case of total extirpation. He believes that the prevention of this accident lies in securing an exact approximation of the uterine wound and healing without infection.

When a patient who has been delivered by Cesarean section again becomes pregnant, she should come under supervision during the later months of pregnancy and should be delivered, if possible, in a hospital. When the accident occurs, the treatment is section, and the operator must decide at the time whether he can close the rent, or must proceed to hysterectomy. This complication is so rare that there is no valid objection to the operation, and with the patient in good hands is not attended with high mortality.

¹ Journal of Obstetrics and Gynecology of the British Empire, February, 1911.

² British Medical Journal, July 1, 1911.

³ Monatschrift f. Geburtshülfe und Gynäkologie, 1911, Band xxxiii, Heft 4.

⁴ Archiv f. Gynäkologie, 1911, Band xev, Heft 1.

Jeannin¹ reports the case of a primipara, aged thirty years, delivered without complications by Cesarean section in her first delivery. Her recovery was uncomplicated and complete.

At the termination of the next pregnancy the patient did not report to the hospital for observation until she came in labor, about eight and a half months. The rupture of the membranes was followed by the discharge of a greenish liquid, and a loop of cord. The child had evidently perished, and it was thought best to deliver the patient by embryotomy to avoid strain upon the uterine scar.

During anesthesia, the examination showed that rupture of the uterus had occurred. The abdomen was immediately opened and hysterectomy performed, with the removal of the dead child.

Owing to the rapid and prompt performance of the operation the patient suffered very little shock, but secondary shock developed, which was severe. From this she rallied, and made a good recovery.

Upon examining the uterus, there was an extensive tear in the anterior wall, opening the previous scar. Upon examining the tissues, it was found that no muscular tissue had developed at the site of the former scar, and this had been replaced by connective tissue. The remaining portion of the uterus was normal.

EXTRAPERITONEAL CESAREAN SECTION. Tweedy² reports 3 cases of extraperitoneal Cesarean section, with good results for mother and child.

The method consisted in making a transverse incision from one anterior superior spine to the other about an inch above the pubes. This was carried down through and to the sheath of the rectus. The sheath was raised from the muscles and the latter separated with the handle of a knife. The transversalis fascia was then penetrated, laying bare the peritoneum. If this can be separated from the back of the pubes and from the bladder, the lower uterine segment can be reached without opening the peritoneal cavity.

Tweedy preferred to open the parietal peritoneum, transversely opening the abdominal cavity and exposing the bladder and lower uterine segment covered by peritoneum. The bladder was raised, and a small incision into the vesico-uterine fold of peritoneum permitted the passage of the finger between the uterus and the bladder. With this finger the peritoneum was divided across the whole width of the vesico-uterine fold. The upper edge of the incised peritoneum was separated upward from the uterus. This was stitched to the margin of the transverse incision in the parietal peritoneum, shutting off the general cavity of the field of operation and enclosing the intestines in a bag of peritoneum. Interrupted stitches should be used, as a

¹ *L'Obstétrique*, March, 1911.

² *Journal of Obstetrics and Gynecology of the British Empire*, August, 1911.

continuous suture causes puckering and contraction of the opening. The sutures should be placed well out toward the lateral aspect of the opening to close the angles. It is not necessary to stitch together the two layers of peritoneum above the bladder. Sufficient room is readily obtained by this method of exposing the lower segment. The uterus is then opened vertically, and the head, if presenting, is delivered with the lower blade of the forceps and the other hand. If the breech presents, the child is extracted by the leg. The cord is clamped and cut. A hypodermic injection of ergotin is then given, and the placenta allowed to separate. It is then removed with the membranes and the uterus tamponed with iodoform gauze, the end of which is carried through the cervix into the vagina. The uterine incision is closed by interrupted catgut sutures, and the free edge of the peritoneum above the bladder is united with catgut sutures to the upper portion of the peritoneum from which it was separated. The corresponding edge of parietal peritoneum may also be brought up in this manner.

The operation, in these cases, was found easy and uncomplicated because the lower uterine segment was very large and very much thinned. One of these cases had been infected by previous examinations, and the wound suppurated until the sutures were discharged.

VAGINAL CESAREAN SECTION FOR ECLAMPSIA. Peterson¹ has analyzed 530 cases of eclampsia, comparing different methods of treatment from the standpoint of delivery, so soon as the diagnosis is made. He concludes that maternal and fetal mortalities are lower the earlier the uterus is emptied after the first convulsion in antepartum eclampsia. Slower methods of delivery should be declined, and the uterus should be emptied by that operation which will give the best results for mother and child. It is his personal belief that vaginal Cesarean section is based upon sound surgical principles, is quickly performed, and can be done by anyone familiar with the rudiments of obstetric surgery. He believes that early diagnosis and treatment will greatly reduce maternal and fetal mortality.

VAGINAL CESAREAN SECTION FOR EDEMA OF THE LUNGS. Massini² reports the case of a multipara in the eighth month of pregnancy, admitted to hospital for delivery, who was seized with a violent attack of pulmonary edema. Medical treatment proved unavailing and the patient became comatose. She was delivered as soon as possible by vaginal Cesarean section, delivery being completed by version; an asphyxiated child was born which could not be revived. The patient gradually rallied and manifested symptoms of cerebral edema, as well as pulmonary edema.

The urine was found highly albuminous and contained fatty casts.

¹ American Journal of Obstetrics, 1911, No. 1.

² Zentralblatt f. Gynäkologie, 1911, No. 3.

The patient made a slow recovery, and left the hospital twenty-three days after operation in fairly good condition.

He has found in the literature of the subject three similar cases in which operation for the same indications was followed by good results.

SUPRASYMPHYSEAL AND EXTRAPERITONEAL SECTION. Roemer¹ compares suprasymphyseal section with hebostiotomy, and concludes that in cases carefully selected the maternal mortality of hebostiotomy is as low as 1.7 per cent., the fetal mortality 6.6 per cent. Lacerations of the vagina and wounds of the bladder have been reduced 50 per cent. by improvements in technique. Suprasymphyseal section has a maternal mortality of 6 per cent., and a fetal mortality of 2.4 per cent.

This operation is more dangerous for the mother than hebostiotomy, but far less dangerous for the child. Improvement in both operations will be obtained by carefully selecting the cases, and limiting hebostiotomy to multiparæ in whom the true conjugate is not less than 7 cm.

Baisch² gives the results of 50 extraperitoneal sections in the clinic at Munich. In 3 cases, the general peritoneal sac was opened; in 1 case, hemorrhage was so profuse that the operator abandoned the effort to make the operation extraperitoneal, and opened the abdominal cavity. In the third case, total extirpation of the uterus was practiced because the patient suffered from heart lesion and hemorrhage. In 16 cases, the peritoneum was wounded somewhat by the extraction of the child, but was immediately repaired.

Three mothers died in this series of cases, 1 from eclampsia, 1 from sepsis, 1 from paralysis of the bowel. In one of these, the peritoneum was wounded. Among the children, there were six deaths. One was premature, 4 had been injured by previous attempts at delivery, and 1 was delivered with great difficulty because of the small space available. Eight of the children were born asphyxiated, but were easily revived.

Frank³ reports 5 cases of suprasymphyseal section, and calls attention to the following important point in the technique of the operation:

He would not operate until the cervix is fully dilated, and would then not attempt to deliver the placenta, as is usually done, but would close the uterine wound, suture the wound in the abdominal wall, and allow the placenta to be delivered through the vagina in the usual manner. He believes that by this precaution the hemorrhage is less, and the patient's general condition is much better.

Polano⁴ reports 4 cases of cervical section by posterior incision, 2 of which were done under lumbar anesthesia. The operation was performed by opening the abdomen, turning out the uterus, and making

¹ Zeitschrift f. Geburtshilfe und Gynäkologie, 1911, Band lxxviii, Heft 2.

² Zentralblatt f. Gynäkologie, 1911, No. 43.

³ Ibid., No. 6.

⁴ Ibid., No. 40.

the incision through the posterior wall of the cervix. Clamps were applied to the abdominal wall during operation. It is believed that the low incision lessens hemorrhage and that it is especially suitable for cases where operation is performed before the advent of labor.

Klotz¹ contributes a critical paper, comparing the results of various operations, and showing the good results obtained in Sellheim's clinic by the suprasymphyseal section.

Benthin² reports a case of cervical section for bicornate uterus and double cervix and vagina. The operation consisted in incising the anterior portion of the cervix of the pregnant half of the uterus and delivering the child, which proceeded without much difficulty. There was practically no hemorrhage. After the removal of the child the uterus contracted in the gravid portion, but there was no contraction in the other side. There was a marked difference of color in the two. The placenta was removed without difficulty, and the patient made a good recovery, complicated by bronchitis.

He has collected 19 cases of transperitoneal section for similar conditions, with one maternal death from apoplexy and uremia.

Beckmann³ reports the results of 43 cases of vaginal section for eclampsia—25 primiparæ and 18 multiparæ. Before the operation, full dilatation was secured by de Ribes' dilating bag. The uterus was opened by anterior incision in one case, with a very large child, both anterior and posterior incision being used. Labor was terminated by version and extraction; in 1 case only by forceps; 1 case, complicated by placenta prævia, with profuse hemorrhage which required prompt removal of the placenta. In 3 other cases there was uterine atony, and the placenta was removed to check hemorrhage. In 3 cases, the uterus was tamponed after operation. In 7 cases, the placenta came away spontaneously; in 32, Credé's method was employed; in 4, the placenta was removed by the hand.

He believes that the placenta should not be removed quickly, but that ample time should be given for spontaneous delivery. When the size of the child is large, the vagina and perineum may be incised to prevent serious laceration. In 1 case only was there rupture of the uterine wall, tearing at the upper end of the incision. There were 8 fatal cases, 2 from septic infection.

He adds to the report of his cases tables comparing the mortality in eclampsia with conservative treatment and with rapid delivery, showing from the first a mortality in 306 cases of 32.9 per cent. by conservative treatment; while from rapid delivery there was a maternal mortality of 18 per cent. When the various operations employed for delivery in eclampsia are considered, vaginal Cesarean section had a mortality

¹ Zentralblatt f. Gynäkologie, 1911, No. 11.

² Monatsschrift f. Geburtshülfe und Gynäkologie, 1912, Band xxxv, Heft 2.

³ Ibid., Heft 2.

of 18 per cent., forceps 33 per cent., version and extraction 14 per cent., and spontaneous birth 10 per cent.

In rapid delivery of the child, the mortality by vaginal Cesarean section was 11.6 per cent., forceps 33 per cent., version and extraction 71 per cent., and spontaneous birth 30 per cent.

His conclusion from his experience is in favor of prompt delivery by vaginal section.

Haertel¹ demonstrated, before the Obstetric Society of Breslau, a uterus from a patient upon whom had been performed suprasymphyseal section. The operation was done by Latzko's method. During the first stage of the operation the membranes ruptured, and the feet of the child appeared at the vulva. The patient died of peritonitis following infection on the ninth day.

On section, an abscess was found between the uterus and the bladder the size of a pigeon's egg. Infection had travelled through the muscular tissues to the peritoneum and had produced a diffuse peritonitis. The uterus and bladder were adherent.

Upon examination, the mucous membrane of the uterus seemed in a healthy condition, although the wound in the uterus had not closed.

Roth² reports 85 hebstiotomies. The method was the subcutaneous; the maternal mortality 2, or 2.35 per cent.; 79 children lived, 6 died, or 7 per cent. fetal mortality.

The degree of pelvic contraction varied in the true conjugate from $6\frac{1}{4}$ to 8 cm. In 13 of the 85 cases there was profuse hemorrhage, in 1 apparently from within the pelvis. In 15 cases, or 17.6 per cent., there were severe lacerations communicating with the severed bone; 29.4 per cent. of these patients were primiparæ, 9.8 per cent. multiparæ. The bladder was wounded in 6 cases—in all, in 14 per cent. There were no injuries to the sacro-iliac joints, except in one case dying of sepsis with thrombophlebitis. In this case the disproportion between the head and pelvis was very marked, and section showed that both sacro-iliac joints had been separated and undergone suppuration.

In the puerperal period, 56.5 per cent. of these patients showed morbidity; 23.5 per cent. had severe fever. Extravasation of blood did not seem to be dangerous, but in 14 per cent. there was thrombosis; 38 of the patients, on whom 40 operations had been performed, were examined afterward. Of these, 10 complained of interference with walking and with their work; 9 referred their disability to the pelvis, to lesions of the sacro-iliac joints. These were cases of highly contracted pelvis. Of the 38 patients, 21 had prolapse in varying degrees, 7 of them being young primiparæ. In 20 cases, the course of subsequent labor was observed; in only 6 had the pelvis been enlarged by the first

¹ Monatschrift f. Geburtshülfe und Gynäkologie, 1911, Band xxxiii, Heft 6.

² Zentralblatt f. Gynäkologie, 1911, No. 9.

operation. In the remainder, the hebostiotomy wound had healed with the formation of bony tissue.

The fetal mortality was 18 per cent., and his conclusion is that the operation is suitable under narrow limits only, and should not be applied in general in private houses.

Ferroni¹ reports 11 cases of extraperitoneal section in the clinic at Parma. The results of the operation were satisfactory, and no especial difficulty was experienced in carrying out the technique.

PUERPERAL PERIOD

Puerperal Septic Infection. THE CUTANEOUS REACTION IN PUERPERAL SEPSIS. Kohler² has studied the question of securing a cutaneous reaction as a means of diagnosis in puerperal septic infection. He finds that by using streptococcic antigens by subcutaneous injection, where the infective agent is the streptococcus, a skin reaction is produced which is of diagnostic and prognostic value. This result is obtained in cases where the streptococcus has gained access to the blood. The occurrence of this cutaneous reaction seems favorable so far as the patient's recovery is concerned, for it is lacking in severe and fatal cases of streptococcus infection.

EARLY GETTING UP IN THE PUERPERAL PERIOD. Aichel³ reviews the literature upon the subject and comes to the conclusion that there is no evidence that early getting up in the puerperal period predisposes to embolism, thrombosis, or to an unfavorable result.

PUERPERAL INFECTION CAUSED BY FRAENKEL'S BACILLUS. Heine-mann⁴ reports a case of diffuse puerperal peritonitis treated by abdominal section at three months pregnancy, where at operation peritonitis was found with dilatation of the intestine, but no sign of formation of gas in the connective tissues. The operation was completed by drainage through the vagina. Cultures were made at the time of operation.

After the patient had recovered from section, the uterus was cleansed and very foul placental tissue was removed. Cultures were also taken from the contents of the uterus. Death followed from diffuse peritonitis a few days later.

Upon section, there were widespread evidences of severe infection, especially in the liver and in the enlarged spleen; gangrenous cystitis, and edema of the lungs. A study of the cultures showed the bacillus of emphysematous phlegmon, or the so-called Fraenkel's gas bacillus. Experiments upon animals with cultures confirmed the diagnosis.

¹ *Annali di Ostetricia*, 1912, No. 1.

² *Monatsschrift f. Geburtshülfe und Gynäkologie*, 1912, Band xxxv, Heft 2.

³ *Zentralblatt f. Gynäkologie*, 1911, No. 6.

⁴ *Zeitschrift f. Geburtshülfe und Gynäkologie*, 1911, Band lxxviii, Heft 2.

A second case of septic abortion is reported, the patient dying soon after admission. Upon section, free pus was found in the abdominal cavity, with septic spleen, cystitis, and double pyosalpinx. Upon culture, Fraenkel's gas bacillus was found in the tissues.

Pruska¹ has investigated the results of early getting up after labor in Rubeska's clinic in Prague. He concludes that when patients get up on the fourth day that the morbidity of the puerperal period is less, involution better, the tendency to thrombosis and retroflexion of the uterus less, and the general condition improved. He is in favor of this early rising rather than staying in bed until the ninth day.

Semon² has studied 86 cases of puerperal infection to determine the presence or absence of bacteria in the blood. Of these, 12 gave positive results and 74 negative results. Of the 12 cases, 6 died, 4 from streptococcus infection, 2 from staphylococcus infection. One of the latter was abortion with septic endometritis and peritonitis. In this case, the staphylococcus were found but once in the blood in a small quantity, and on the day following could not be detected in the blood at all. Evidently the staphylococcus can produce fatal results without extensively invading the blood.

The other case of staphylococcus infection proved fatal by pyemia in forty-eight days. In the lochia, hemolytic streptococci were found in pure culture. The blood at the first examination was sterile, but, fourteen days after the beginning of the illness, showed staphylococcus, diminishing in quantity until none were found. The patient died from thrombosis with pulmonary metastases, and streptococci were found postmortem in the heart blood.

The other 4 fatal cases had hemolytic streptococci in the blood in varying quantities.

It may be interesting to observe that of the 86 cases in which the blood was sterile, hemolytic streptococci were found in the lochial discharge in 23 cases, but in the other varieties streptococci were found in the lochial discharge in 14 cases. Hemolytic staphylococci were found in the lochia in 18 cases; in those not hemolytic, in 4. The bacillus coli communis was present 3 times; the pneumococcus once, and a mixed infection 7 times. In but 4 of these was the lochia sterile.

Lamers³ reports a septic case of abortion in which a fatal result occurred through poisoning with hemolytic staphylococcus aureus. Upon examining the blood after death, abundant hemolytic staphylococci were found. Autopsy showed abscesses in the pectoral muscles, in the heart muscle, in the pleura, in the lungs, and in the liver. The kidneys were also studded with small abscesses. Upon cutting the uterine muscle, pus exuded from its sinuses. The pus found in the abscesses

¹ Monatsschrift f. Geburtshilfe und Gynäkologie, 1911, Band xxxiii, Heft 3.

² Ibid., Heft 2.

³ Ibid., Heft 2.

throughout the body gave abundant growth of staphylococcus. An examination of portions of the placenta removed from the uterus showed minute collections of pus throughout its tissues containing the same germ.

Puerperal Psychoses. Meyer¹ states that formerly the percentage of puerperal psychoses was variously given as 12 to 15. In the last ten to twenty years this has diminished from improved hygiene during parturition and the lessening of septic infection. He now believes the frequency of puerperal psychic disturbances should be not more than 6 per cent. His own observation covers 1519 cases of psychic disease, among which were 80 puerperal cases, or 5.26 per cent. Of these, from 20 to 30 per cent. are the psychic disturbances of lactation, and 10 to 20 per cent. those of pregnancy.

Of the 80 cases, 41 were dementia præcox; 16 effective psychoses; 10 belonging to the amentia group; 3 to epilepsy or hysteria; 2 to eclampsia; and 1 to Basedow's disease, alcoholism paralysis with cerebral complications sometimes seen in pregnancy and uremic delirium.

Meyer does not think that heredity plays much part in puerperal psychoses. Most of these cases develop during the first pregnancy. Gestation should be interrupted if its continuance threatens a persistent and severe disease of the nervous system which can be controlled in no other manner. In the amentia group, the prognosis is good and the disease is usually not protracted.

In treating these cases, local interference is usually harmful. In prophylaxis, puerperal infection must be carefully avoided, and those conditions also unfavorable to pregnancy. Meyer does not believe that there is a specific puerperal psychoses, but that this condition in parturient women is caused by some complication of gestation.

Puerperal Sepsis. Harrar² describes the treatment employed in puerperal septic infection in the Lying-In Hospital of New York. Breast, lung, and throat conditions are first ruled out. By appropriate tests, pyelitis, malaria, and typhoid are excluded. A cathartic is given and the bladder is promptly emptied. If there have been recent lacerations, and stitches have been inserted, if these are infected, they are removed. The abdomen is examined to ascertain the height of the fundus, the presence of tenderness or resistance, and rigidity or tympany. If the pulse and temperature are high, cultures are taken from the cervix and uterus, whether the lochia is foul or not, and the vagina and cervix are inspected. Should the cervix be patulous and gaping, it is inferred that portions of membrane or placenta are retained. If, in comparison with the temperature, the pulse rise is but slight, no vaginal inspection or cultures

¹ Monatschrift f. Geburtshilfe und Gynäkologie, 1911, Band xxxiii, Heft 2.

² Bulletin of the Lying-In Hospital of New York, 1911, No. 4.

are made. After the preliminary examination, the head of the bed is elevated considerably and an ice-bag applied to the lower abdomen. If the temperature does not fall, and the pathologist reports that gonococcus or streptococcus is found, the treatment already described is continued. If the colon bacillus is detected, or no growth reported, and the lochia foul, the uterus is gently douched. A digital examination is made as carefully as possible, and any fragments of membranes or clot are removed. Curetting is never practiced except in incomplete abortion at or before the third month. The further treatment depends upon the complications which develop.

THE TREATMENT OF ACUTE PUERPERAL PERITONITIS. Bouquet¹ reports a series of 27 cases of acute peritonitis in the puerperal period. In none of these cases did he find hysterectomy indicated. Some of these cases followed abortion, others confinement at full term.

The principle of operation consisted in lateral incisions with drainage, with the employment of the gauze wick covered through the greater portion with rubber. In some cases, pyosalpinx was found; in others, appendicitis; and in others, no lesion of the viscera, but free and infected fluid in the peritoneal cavity.

The conclusions drawn from this series were to avoid radical operation, and in all doubtful cases to drain as early as possible.

INFLAMMATION OF THE PAROTID GLAND IN THE PUERPERAL STATE. Ferroni² reports an interesting case of enlargement of the parotid gland in a primipara after normal labor. The mouth, teeth, and gums were normal, and the salivary functions seemed normally performed. There was no fever and no assignable cause could be detected for the parotid enlargement, which gradually disappeared.

THE TREATMENT OF PUERPERAL PSYCHOSES. Pique,³ in 10 cases of puerperal psychoses, found a condition of the uterus which seemed to influence the mental state in 2 cases. In all, puerperal infection was suspected and the contents of the uterus was promptly evacuated; but uterine disease could be demonstrated in but 2 only. Some of these patients were without fever, and all responded to general hygienic measures.

PUERPERAL INFECTION BY LOEFFLER'S BACILLUS. Bourret⁴ has collected 43 cases of puerperal infection by Loeffler's bacillus. It was difficult to trace the mode of infection with these patients. In some, contagion resulted from the visit of infected persons, especially during an epidemic of scarlatina and diphtheria. In some of the fatal cases, no lesion of the genital tract could be found. As a rule, symptoms of infection developed in three or four days after its occurrence. A false

¹ *Archiv Mensuelles L'Obstétrique*, January, 1912.

² *Annali di Ostetricia*, 1911, No. 6.

³ *L'Obstétrique*, July, 1911.

⁴ *Ibid.*, October, 1911.

membrane forms in the genital tract resembling that which is formed usually in the larynx and throat. The external genital organs became edematous, and the lymphatic glands were enlarged. Paralysis of the sphincters was also noticed. The general symptoms were those of diphtheria and fever was present in several cases. There was considerable variation of the pulse, from 124 to 140, and the temperature was usually subnormal. The usual constitutional depression was present. The diagnosis was made by bacteriological examination. The treatment consisted in the use of antitoxin.

In the 43 cases there was but 1 fatal issue. Many of the patients made tedious recoveries, some of them complicated by paraplegia and by the appearance of diphtheric lesions in the pharynx or nose. In some, mixed infection with streptococci was present.

THE DIAGNOSIS OF PUERPERAL PYEMIA. Olshausen¹ would make the diagnosis between puerperal septicemia and pyemia largely by the occurrence of chills. Pyemia develops most often after cases of labor complicated by placenta prævia, premature separation of the placenta, or retention of a portion of the placenta. In chronic pyemia, chills are of daily occurrence. In one patient, there were seventy in as many days.

The prognosis of puerperal pyemia is difficult to make. Most cases perish in two or three weeks. If the patient survives the third week in fair condition, the prognosis is better, especially if the chills grow less frequent. Radical operations should be avoided in these cases, if possible, because of the danger of shock.

Keller, in discussion, believed that cases of varicose veins of the vagina with extensive lacerations during labor were especially apt to develop pyemia, if infected. The passage of sutures through the vessels seemed to favor septic thrombosis. This is sometimes seen after operations for hemorrhoids.

An important point in diagnosis is the condition of the pulse, and its relation to the temperature. Operation is seldom indicated unless the operator can detect the infected focus and attack it directly.

Ruckert reported the case of a multipara in whom the placenta had a very low attachment. Portions of membrane were removed by the midwife in attendance, with dressing forceps. Rapid pulse developed on the following day, and on the fourth day chills with high pulse and temperature. On the fifth day the uterus was irrigated with iodine alcohol, and 1 c.c. of 5 per cent. collargol solution was given by intravenous injection. The patient was stuporous at the time and seemed severely infected. Profuse perspiration followed, with a drop of temperature to normal; pulse 100 to 120. Two injections of 2 c.c. of 5 per cent. collargol were then given, followed on the evening of the same

¹ Zentralblatt f. Gynäkologie, 1911, No. 10.

day by severe chills, with sweating and drop in temperature. Two cubic centimeters were again given by intravenous injection. The chills grew less severe and less frequent, and the patient recovered. At the fifth injection the wall of the vein was wounded, and some of the solution escaped into the surrounding tissues. Pronounced inflammation and swelling with severe pain resulted, and the arm was practically useless for two weeks.

Strassman believed that, in cases of puerperal pyemia, enlargement of the spleen is always a most significant and serious symptom. Tenderness at the sides of the uterus is also a symptom of importance. In his experience, ligation of the veins and the ligaments had been found a serious procedure. He had treated the chills successfully with stimulants, such as hot tea, hot wine, and antipyretics, and cases which recovered had begun to improve at about the sixth day. In 1 case he had used one injection of collargol.

While this patient recovered, she suffered from thrombosis of the vein in the arm in which the injection was made. In some cases he thought he had seen favorable results from the use of Crede's ointment.

Puerperal Bradycardia. Lynch¹ studied 103 primiparæ and 82 multiparæ to determine the slowing of the pulse in the puerperal period. He found that the average pulse in multiparæ was twice as apt to be slower in the puerperal period than to remain at its previous rate. The average pulse of primiparous patients was quite as likely to remain unchanged. In 6 of every 10 patients examined, the average pulse was three or more beats slower in the puerperal period. A fall of ten or more beats was observed in one-fifth of the series, in greater frequency in multiparæ than in primiparæ. It was found that the more rapid the pulse had been during pregnancy, the slower it became in the puerperal period, and if the pulse had been slow during pregnancy, it often increased in rate after the birth of the child.

The getting up of the patient on the eighth day did not, in a large percentage of cases, increase the pulse-rate. He did not observe the slow pulse which develops on the second day, reported by some authors.

Inversion of the Puerperal Uterus in Chronic Nephritis. Loyacons² reports the case of a patient admitted to hospital just before labor, giving birth spontaneously to a normally developed child. Labor was followed by considerable hemorrhage and the placenta was finally removed from the cervix manually.

Upon examining the patient, it was found that the uterus had become inverted. This was followed by a profound collapse from which the patient died three hours after delivery.

At autopsy, the uterus was found partially inverted, with the ovaries

¹ Surgery, Gynecology, and Obstetrics, May, 1911.

² Archiv f. Gynäkologie, 1911, Band xciii, Heft 2.

and tubes prolapsed. The kidneys showed chronic nephritis and multiple small abscesses in the left kidney.

In searching for the cause of inversion, the relaxed and anemic condition of the patient, and the employment of Crede's method in delivering the placenta, were thought to have caused the accident. Two similar cases are reported by Kwasostansky, in which in patients having chronic nephritis, the uterus failed to contract after labor, with a fatal result. In these cases, examination of the uterine muscle showed advanced hyaline degeneration.

ANAEROBIC BLOOD CULTURES IN PUERPERAL SEPSIS. Lamers¹ reports cases in which he found anaërobic bacteria streptococci pyogenes, in patients septic after abortion, and delivered by operative procedures. In other cases he detected the *Bacillus coli communis*. In one case of pyemia he found anaërobic streptococcus probably identical with the *Streptococcus putridus*.

Polak,² from his experience in dealing with puerperal infection, believes that curettage, douches, and examinations during the acute stage of puerperal infection, break down the natural barriers, spread infection, and that the danger from curetting increases as the period of pregnancy advances. The curette should never be used in acute streptococcic infection and should never be employed over the placental site. Instrumental evacuation of the uterus should be limited to pregnancy of eight weeks or under; and exploration and curetting by the finger is the best method available. If the uterus is once thoroughly emptied, the pelvis should be let absolutely alone, except for postular drainage; and treatment should be directed to supporting the patient and increasing her natural blood resistance. If the blood is sterile, and resistance is shown by increased leukocytes, the prognosis is favorable, no matter what form of bacteria are found in the uterine cavity. Exudative foci develop after labor and should never be disturbed if they become localized as long as the patient shows signs of improvement. Should a collection of pus form which is localized, this should be drained by extraperitoneal incision. When exudative peritonitis occurs, it is usually the result of endometritis, neglected or badly treated. Thrombophlebitis should be considered a conservative process and should not be disturbed.

In the majority of patients, nature is competent to localize and circumscribe the infection. Large pelvic and abdominal exudates may disappear without operation, and damaged tubes and ovaries may regain their normal size and function. So long as the patient is improving, surgical interference is not indicated. Operation should be postponed until the acute stage of infection has subsided. In non-operative treatment, vaccines are useful.

¹ Zeitschrift f. Geburtshülfe und Gynäkologie, 1911, Band lxxviii, Heft 1.

² American Journal of Obstetrics, September, 1911.

ANAEROBIC STREPTOCOCCI IN PUERPERAL SEPSIS. Bondy¹ has found that without doubt anaerobic streptococci may produce a severe form of puerperal infection, often beginning with fever during labor. Although these germs are normally present in the vagina and in the intestine, their presence may occasion no disturbance until labor develops, when they usually cause fever, and by ascending infect the uterus.

PUERPERAL SPONTANEOUS INFECTION. Poten,² in 1500 parturient patients whose labors were conducted without internal examinations, had 2 deaths from septic infection. Previously, in 10,000 cases of labor, there had been 3000 not examined, and one death from sepsis following the retention of a portion of the placenta.

Poten concludes, from his experience, that it is impossible to absolutely rule out spontaneous puerperal infection, and ascribes it to germs already within the body of the mother before the beginning of labor.

FIFTY FATAL CASES OF PUERPERAL INFECTION. Stowe³ finds, from a study of these cases admitted to the hospital, that physicians are quite as culpable in producing infection as are midwives. Out of 22 full-term deliveries, 14 were spontaneous; yet these patients died from puerperal infection. While in the hospital these patients were given the most energetic stimulation with alcohol and judicious feeding. Salines were used freely by rectum and by hypodermoclysis. Anti-streptococcic serum and collargol were used in severe cases.

In 22 cases, the patients died within forty-eight hours after admission; 8 died within eight hours; 9 had general and 3 local peritonitis at the time of operation; in 12 cases operation was followed by an immediate change for the worse, and undoubtedly hastened the patients' death; in 2 cases the patients collapsed from the anesthetic; while in 2 others the operation was unduly prolonged.

So far as treatment is concerned, no intra-uterine treatment is considered advisable, except in the presence of hemorrhage. Disturbance of the uterus by the curetté, the finger, and the intra-uterine douche, often causes death.

While it is difficult to recognize septicemia in the early stages, and to promptly institute proper treatment, every care should be taken to conduct labor cases under surgical precautions. The patients should be thoroughly cleansed before labor, and care should be taken in giving an enema that material from the bowel is not carried into the uterus or bladder. In cases of abortion, the uterine contents should be completely discharged, aided by the use of the finger, or by packing with iodoform gauze. In sapremic cases, although the discharge is foul, if drainage is good and uterine contraction is not to be feared, interference with

¹ Monatsschrift f. Geburtshülfe und Gynäkologie, 1911, Band xxxiv, Heft 5.

² Zentralblatt f. Gynäkologie, 1911, No. 39.

³ Surgery, Gynecology, and Obstetrics, January, 1912.

the uterus should not be practised. Forceful instrumental dilatation of the cervix in septic abortion produces great harm, and in septic cases the curette should not be used. If infection has spread to the tissues about the uterus, the uterus should be let entirely alone. After labor at term, the curette should never be employed, and even the presence of retained membranes is not necessarily serious. Irrigation, both vaginal and uterine, is also a positive means of danger, and greatly increases mortality and morbidity. Drainage of the uterus by artificial means in these cases is also useless. Where exudate forms in the pelvis, and Douglas's cul-de-sac is distended with fluid, posterior colpotomy is an operation of great value. Collections of pus high in the pelvis should not be disturbed until the acute process has terminated. In the presence of infection, sutures in the cervix or perineum should be removed, and wet bichloride dressings applied. In general peritonitis, drainage through the abdominal wall by multiple incisions gives the best results. Hysterectomy is only indicated when the uterus has been severely wounded, when inflamed or gangrenous myomas are present, when there is an abscess in the uterine wall, or when the fetus has undergone mortification *in utero*.

But little definite value can be ascribed to serum therapy or to the use of collargol. Intravenous injections of bichloride of mercury have proved useful in some cases.

VACCINES IN PUERPERAL SEPSIS. Hawkyard¹ reports 4 cases of puerperal sepsis in which the streptococcus, colon bacillus, and staphylococcus were found present. In one case the nurse in attendance had a suppurating finger, which was the cause of the patient's infection. These cases did well, and immediate improvement followed the use of vaccines.

PUERPERAL MORTALITY IN EUROPE AND AMERICA. In the *Archiv f. Gynäkologie*, 1911, Band xcv, Heft 1, van Tussenbroek and Unterberger give the results of their investigations in the puerperal mortality respectively of Holland and Mechlenberg-Schwerin.

Van Tussenbroek finds that extensive epidemics of puerperal sepsis rarely occur. Groups of septic cases may develop in towns of considerable size but very rarely in small villages. In a scattered population, the danger of contamination from one septic case is evidently less; in large cities septic cases may develop in groups, but without a local epidemic. Under aseptic precautions there has been a marked diminution in septic mortality, and especially outside of maternity hospitals. The practice of midwives in Holland is not attended by a considerable septic infection.

If a comparison of various years is made, the general septic mortality has diminished since 1875 from 6.3 per thousand to 4.6 per thousand.

¹ British Medical Journal, January 6, 1912.

Amsterdam is credited with a mortality in the puerperal period in the year of 1900 of 9.7 per cent. Other cities and towns show a larger mortality.

Unterberger's studies indicate that it is difficult to obtain accurate reports of puerperal sepsis. He finds 1 death in 448 labors from puerperal septic infection. The last census published by the United States gives 7.3 per thousand septic mortality of puerperal women in the United States. This also cannot be taken as strictly accurate as many septic cases are never reported.

In comparison with the returns from the United States is the low septic mortality in Holland, 1.7 per thousand, and the mortality rate in Mecklenberg-Schwerin.

Hemolysis by Streptococci in the Vaginal Secretion of Pregnant and Parturient Patients. Laemers¹ has found hemolytic streptococci in the genital organs and also in the secretion of the genital tract during pregnancy. This, however, is not the rule, but the exception. Hemolytic streptococci found in the local secretion cannot be explained by the increase of these germs from those already present during pregnancy; nor can their presence be ascribed to internal examinations during labor. It is not thought that the presence of these germs during the puerperal period has resulted from the ascent of bacteria from the external genitals during labor or the puerperal state; nor does it seem probable that these germs are conveyed from one patient to another. In pregnant, parturient and puerperal patients, germs are found of weak hemolytic potency which must be considered as transitional forms between hemolytic and non-hemolytic streptococci. It is thought that from those which are not hemolytic the genuine hemolytic streptococci can develop, and that this occurs in those cases in which hemolytic streptococci are found in puerperal patients without the presence of fever or other symptoms of infection. Genuine hemolytic streptococci which produce pathological disturbances in the puerperal state are derived from foreign streptococci introduced at some time into the body of the patient. The hemolytic power of streptococci does not necessarily indicate their virulence but rather the conditions under which they develop. It would be of great value in increasing our knowledge on this subject if some test could be devised by which the exact hemolytic property of streptococci found in a given patient could be determined.

The Effect of Momburg's Tube on Blood Pressure, Pulse Rate, Respiration, and Temperature in the Puerperal Condition. Adair² has investigated the results of the use of Momburg's tube in 23 cases. The maximum pulse rate during the application of the tube exceeded the normal in 21 cases. The greatest increase was 74 beats, the least was 3 beats;

¹ Archiv f. Gynäkologie, 1911, Band xcv, Heft 1.

² Surgery, Gynecology, and Obstetrics, February, 1912.

the average was 29 beats. The minimum rate while the tube was applied equalled the normal three times.

After the removal of the tube, the average increase in pulse rate was 10, the average decrease 21 beats. The tube causes an increase in the pulse rate, which shows a tendency to reach normal after the tube has been applied for a few minutes. This is probably caused by the decreased volume of blood which the heart has to pump and which causes it to beat faster. The removal of the tube opens new channels, and the heart beats at first rapidly, and then more slowly.

The respirations during the application were usually increased in ratio, the greatest increase being 34, and the least 1 per minute. The average increase was 10. When the tube was removed the respirations returned to normal in a few moments. This increased breathing was probably caused by displacement of the abdominal organs. There was also an average increase in temperature of one-half a degree during the use of the tube, probably because the skin of the lower half of the body acted less vigorously in radiation. After the removal of the tube the temperature fell one-fifth of a degree. Constriction by the tube caused an average increase in blood pressure of 22 mm. Blood pressure varied greatly during the use of the tube and after its removal.

Syphilis in Puerperal Cases. Weber¹ in a recent monograph reports the results of the Wassermann reaction in 67 cases of pregnancy terminated before the twenty-eighth week. In 35 cases ending within the first four months, not one gave a positive result. Of 32 later cases, 12 gave positive reaction, and the examination of 9 dead fetuses from these mothers showed spirochete in 6; in 33 cases of recurrent abortion, 6 only gave positive reaction. When the macerated fetus from these patients was examined, the spirochete was found in 84 per cent. of the organs, most often in the adrenals, next in the liver and lungs in the vicinity of the vessels. The ovary, testicle, and epididymis contained the germ, which was rarely found in the spleen. In living children the spirochete was found in the vesicles in cases of pemphigus. When the organs of the fetus contained the germ of syphilis, Trinchese found it also present in the placenta, but in smaller numbers. Apparently the spirochete circulates in the fetal blood and penetrates the vessels and villi, causing thickening of the syncytium.

Upon gross examination, the placenta showed no signs of syphilis in these cases.

In 140 cases in which syphilis was suspected, Baisch obtained a positive reaction in 102, and negative reaction in 75.

Acute Parotitis in the Puerperal Period. Crook² reports the case of a primipara who for some years had pyorrhea alveolaris. In the thirtieth

¹ Die Syphilis, etc., Berlin, 1911.

² British Medical Journal, March 2, 1912.

week of gestation she complained of shooting pains in the arms, neck, and throat, with slight edema of the legs. There was considerable albuminuria, and labor was induced. The child was stillborn, but not macerated. Three hours afterward the patient collapsed. She was treated with hypodermic injections of pituitary extract, digitalin, and morphine. Salt solution was given by the bowel. The patient rallied and developed a temperature of 102° F., with enlargement and tenderness of the right parotid.

The gland was afterward incised and pus escaped. The vaginal discharge was offensive, and the patient complained of pain in the calves of the legs.

A culture taken from the parotid showed staphylococcus. There was also cystitis from the streptococcus and *Bacillus coli communis*. The patient also suffered from excessive salivation. It is thought possible that the septic condition of the mouth during pregnancy was the origin of the infection.

Bacteriological Examination in Cases of Puerperal Fever, in Abortion, and during Labor. Wornekros¹ gives the results of the examination of 20 cases of fever in Bumm's clinic in Berlin.

The examination of the blood was negative. In the lochia, anaërobic streptococci of the putrid variety were found but twice; in the other cases streptococci, staphylococci, the pseudo-diphtheric bacilli, and the *Bacillus coli communis* were present.

No positive conclusion is reached as to the precise method of infection in these cases. It is interesting to note how frequently bacilli were found in the lochia, and how rarely in the blood.

The Influence of Placental Substance, Fetal Tissue, and Lymphatic Tissue on the Production of the Secretion of Milk. Aschner and Grigorou² have conducted experiments upon animals to determine the influence of these bodies upon the production of milk. When animals were taken which had previously borne young, subcutaneous injections of lymphatic material produced the secretion of milk. In animals which had never borne young, placental extracts and extract of fetal tissue, or watery extract, produced hypertrophy of the glands and secretion of milk. The freshly prepared extract of recently removed ovaries produced the same result in a lesser degree, but the corpus luteum was without effect. It was found that the substance producing these results is soluble in water, but is destroyed by alcohol and by heat. The extract from the various organs obtained by cooking or by boiling produced only moderate hyperemia and secretion of colostrum.

A criticism of these experiments, with reference to a former paper upon the subject, is published by Baisch.³

¹ Zentralblatt f. Gynäkologie, 1911, No. 28.

² Archiv f. Gynäkologie, 1911, Band xciv, Heft 3.

³ Ibid., 1912, Band xevi, Heft 1.

Osteomalacia Treated by the Porro Operation. Seligman¹ reports a case of very severe osteomalacia treated by the Porro operation.

The patient was a multipara, and at the time of operation suffered so intensely that she could not rest in bed and was scarcely able to move. The operation was done at the patient's dwelling, and resulted in the very prompt relief of the patient.

NEWBORN

The Pathogenesis of Hemorrhage in the Newborn. Bonnaire and Durante² report 4 interesting cases of fatal hemorrhage in the newborn, not caused by traumatism, and characterized by profuse hemorrhage into the peritoneal cavity. This condition undoubtedly arose from an intoxication or chronic infection of the mother, producing vascular lesions and cellular degeneration in the liver of the infant, lessening the fibrinogen in the blood and its power of coagulating. At the time of birth this condition produces leukocytosis and congestive phenomena in the child. In a healthy infant, rupture of the small vessels is checked by coagulation, but in these cases, as the blood does not readily coagulate, it collects in the parenchyma and beneath the capsule of the liver, the hemorrhage increasing by the least motion or traumatism, and often continuing spontaneously. Hepatic toxemia is the most probable condition present in the mother in these cases.

The article is fully illustrated with gross and microscopic sections from the fetal liver.

The Treatment of Hemorrhage in the Newborn by Direct Transfusion of Blood. Lespinasse and Fisher³ report 6 cases of hemorrhage in the newborn treated by transfusion, with an immediate cessation of the hemorrhage. The general symptoms increased, and 3 of the cases recovered. The one which died was syphilitic; the others were due to defective coagulating power of the blood, or septic infection, which seemed to be overcome by the bactericidal properties of the plasma in the blood injected.

The blood should be taken from the father, if possible from the radial artery, and the child watched very carefully to guard against acute dilatation of the heart by a too rapid flow. One of the children transfused weighed 4 pounds. The amount of blood required is very small and is to be gauged by the effect. The popliteal vein of the child may be sutured to the radial artery of the father.

In 3 of these cases the operation was performed by others; the fourth operation was done by the writers of the paper. This last case terminated fatally, the mother having hereditary syphilis.

¹ Monatsschrift f. Geburtshülfe und Gynäkologie, 1911, Band xxxiii, Heft 3.

² L'Obstétrique, 1911, No. 10.

³ Surgery, Gynecology, and Obstetrics, 1911, No. 1.

The Results Obtained by Nursing Infants at Intervals of Four Hours. Heidmann¹ found that by having newborn children nurse every four hours the loss in weight after birth persisted on the average about three days.

In 80 per cent. the child regained its initial weight in six days; in 79 per cent. in fourteen days; in 73 per cent. in ten days; in twelve days the great majority would have regained the initial weight.

When this is compared with other series of cases in which the child is nursed more frequently, the results of four-hour nursing are good. Mother and child have abundant rest by this method, the nipples are not so frequently bruised or softened, diseases of the mouth of the infant and breast of the mother do not occur so frequently, and where the mother is obliged to do household work she is in a much more favorable position to carry this out.

Fracture of the Humerus Healed in Pseudarthrosis within the Uterus. Rosenstern² reports the case of an anencephalic fetus where the x-ray study of the fetus showed a fracture of the left humerus with the formation of callus and a false joint before the birth of the child. The fetus was extensively malformed in other particulars and did not survive.

Laceration of the Tentorium in the Newborn. Baureisen³ reports 2 cases in the clinic of Kiel of rupture of the tentorium in the newborn. One occurred in polyclinic practice where an effort had been made to apply forceps. The patient was then brought to hospital, and as the heart sounds of the child were good, she was allowed to deliver herself spontaneously. The child was born asphyxiated, although the heart was beating well. The child could not be revived and the heart gradually failed.

Upon section, there was bleeding over the cerebellum and oblongata, and extensive laceration of the tentorium.

In the second case the child was in transverse position and was delivered by version and extraction without especial difficulty. During the delivery of the head, pressure was made behind the pubes of the mother. The child was asphyxiated, with the heart beating strongly, but could not be revived. Section revealed extravasated blood over the occipital and temporal regions, and fresh blood over the tentorium. The upper portion of the tentorium showed an extensive laceration.

An illustration accompanies the paper.

The Use of Nitrate of Silver in the Eyes of the Newborn. Hellendall⁴ calls attention to the fact that 1 per cent. solution of nitrate of silver in the eyes of the newborn is a safe and efficient remedy. He has collected the experience of 28 clinics, with a total of over 50,000 cases, and has studied the question carefully in his own experience.

¹ Monatsschrift f. Geburtshilfe und Gynäkologie, 1911, Band xxxiii, Heft 2.

² Ibid.

³ Zentralblatt f. Gynäkologie, 1911, No. 32.

⁴ Ibid., No. 42.

His conclusions are that when the so-called silver catarrh follows the use of 1 per cent. nitrate of silver, it is not the silver which has occasioned the irritation but free sulphuric acid in the solution. A properly prepared solution, he believes, is unirritating and efficient.

Sepsis in the Newborn Originating in Bednar's Aphthæ. Linzermeier¹ reports 3 cases of sepsis in the newborn originating in Bednar's aphthæ. The disease developed at the end of the first week, with profuse purulent secretion from the nose, and a diphtheritic membrane upon the gums, with infiltration of the connective tissue. Infection evidently entered the intestinal tract from material swallowed, and the mucous membrane of the bowel showed a similar condition. Hemolytic streptococci were present as a cause of the infection, and the diphtheritic bacillus was not found. In another case, the staphylococcus was the cause of the infection.

The Inhalation of Oxygen in Asphyxia of the Newborn. Engelmann² has obtained good results by a simple apparatus which gives oxygen to the newborn. The pressure should not exceed 2 cm. of water, and preferably should be less than this. All cases of asphyxia in the newborn are suitable for this treatment, and it should supersede forcible efforts at establishing respiration.

The Advantages of Sophol over Nitrate of Silver in the Eyes of the Newborn. Hannes³ reports the results obtained by the use of sophol in 5 per cent. solution, in 1595 children. One or two drops were placed in each eye, after cleansing the lids gently with sterile water and sterile cotton. In from 8 to 10 per cent. of the cases, a slight secretion of tears followed the use of the remedy. In 20 cases, or about 1 per cent., there was considerable reaction with serous secretion. In but 3 was the irritation pronounced enough to produce a secretion of pus.

In the first 157 cases, 10 per cent. showed irritation, but afterward the percentage fell to 0.48 per cent. The use of nitrate of silver, in his experience, produced 30 per cent. of irritation. In 3 cases only did ophthalmia develop. Two of these were early infection, and one a late infection.

In comparison with nitrate of silver, he quotes the results in 2652 children. Among these there were 7 cases of early infection, and 2 of late infection, under the nitrate of silver treatment.

In 1595 children treated with sophol, there were 2 cases of early infection and but 1 of late infection.

Hemolysis in Relation to Icterus Neonatorum. Slingenburg,⁴ from his studies in the blood of the newborn, believes that icterus neonatorum is of hepatic origin. He bases his reasons for this conclusion upon the fact that, by studying the blood of the newborn, he finds that the

¹ Zentralblatt f. Gynäkologie, 1911, No. 50.

² Ibid., No. 1.

³ Ibid., No. 1.

⁴ Archiv f. Gynäkologie, 1911, Band xciii, Heft 1.

resisting power of the blood is greatest in children who have icterus, and that this results from the passage of bile into the blood. This undoubtedly happens in all cases in differing degree, and where considerable bile is extravasated into the blood icterus is the result.

Atresia of the Duodenum Causing Death in an Infant Aged Seven Days. Hauser¹ reports the case of an infant born in the middle of the ninth month of pregnancy, the mother having polyhydramnios. The child was a female 48 cm. long, and corresponding in weight. The placenta was apparently normal. The child had nursed badly, and was given the bottle in addition. It was also placed in an incubator. The child had frequent vomiting, and a discharge of meconium and mucus from the bowel. No undigested milk was present in the stools. The vomit consisted of coagulated milk, followed by greenish-black and brown material. The child died on the seventh day.

At autopsy, the stomach and upper portion of the intestine were found greatly distended, so that the greater curvature of the stomach reached the umbilicus. Near the gall-bladder was a ring-shape constriction of the duodenum, which was evidently the pylorus. Atresia of the duodenum was present, congenital in character.

The Passage of Lead, Phosphorus, Arsenic, and Mercury from Mother to Child. Petrucci² has conducted experiments to determine the passage of these substances from mother to fetus.

He concludes that these substances administered to the mother, while they may be arrested in the part in placenta, ultimately find their way into the fetal bodies.

The Possibility of Nursing in the Newborn. Jaschke,³ in 100 newborn, succeeded in having 100 per cent. nourished by the mother. Mothers and children remained under observation in the hospital for two weeks. Where there was a temporary lack of milk, other patients contributed sufficient until the mother's milk was sufficient and suitable. In but one case was it necessary to give the child the bottle for a short time only, the mother afterward being able to nurse it entirely. This result was obtained by persisting in the effort to nurse, and by giving the mother the best possible hygienic care.

Scleroderma in the Newborn. Geiser⁴ reports 8 cases of scleroderma in the newborn. In 7, albuminuria was present in the mother, and in 3, at the time of labor, the mother had nephritis. Of the 8 infants, 2 died in clinic, and 1 some weeks after its discharge, from enteritis. One of the mothers had myxedema.

Congenital heart defects and exposure to cold seem also to predispose to scleroderma.

¹ Monatschrift f. Geburtshülfe und Gynäkologie, 1911, Band xxxiv, Heft 6.

² Annali di Ostetricia e Ginecologia, 1911, No. 10.

³ Monatschrift f. Geburtshülfe und Gynäkologie, 1912, Band xxxv, Heft 1.

⁴ Ibid.

As regards the pathology of the condition, examination shows in these cases fatty acids are present in the skin in but 43.3 per cent., while with adults they are found in 65 per cent. The melting point of the fat in these cases was found to be 35° C. The low body temperature of the infant has much to do with its prostrate condition.

So far as treatment goes, the child should be kept abundantly warm, with the best possible ventilation. So soon as the first sign of the disease appears, the child should be fed with the mother's milk or the milk of the wet nurse, taken with a spoon or by a tube introduced into the stomach. Stimulants should also be administered and the inhalation of oxygen practiced. For the edema present, hot baths, massage, and passive movements are indicated. Additional danger to the child develops because of the frail condition of the tissues, predisposing to infection of the mouth or umbilicus or the digestive tract.

The reviewer had recently under observation an interesting case of this sort in which one assignable cause detected was severe nervous shock on the part of the mother. The child survived its birth but a few days, having characteristic and typical symptoms.

Congenital Umbilical Hernia. Hannes¹ recently demonstrated, before the Obstetrical Society of Breslau, a child, aged six weeks, born with umbilical hernia as large as a goose egg. The hernia contained a well defined ring, and was filled with intestine, and showed beginning incarceration. Twelve hours after labor a radical operation was performed. The bowel was readily replaced after opening the hernia and incising the ring, the covering was dissected out, and the parts brought together by suture in layers. Union by first intention resulted.

In the Breslau clinic, 5 radical operations for this condition have been recently performed, with 4 successful results.

Fetal Amputation of the Thigh. Küster² reports the case of a child born normally, at full term, of healthy parents. It was brought to hospital soon after birth, and was found to be well developed and fairly nourished. The abdomen was greatly distended, and the left upper portion of the thigh was lacking. There was also a deficiency in the opening of the anus and a portion of the external genital organs. At the site of the thigh there was a granulating surface, and a further study of the fetus by the x-ray showed that amputation of the thigh had occurred *in utero*.

In the recent literature of fetal deformity is reported a case of congenital absence of the entire pelvis, where at the time of birth strong amniotic bands were present binding the head, back, and breech of the child to the placenta.

The cause of the amputation was undoubtedly constriction by an amniotic band.

¹ Monatschrift f. Geburtshülfe und Gynäkologie, 1912, Band xxxv, Heft 1.

² Ibid.

Basset reports the case of a child, aged four weeks, born with intra-uterine amputation of the left forearm. The mother had previously given birth to four healthy children. No assignable cause could be found in the history of the mother during her pregnancy, except that of amputation by amniotic bands.

Intracranial Bleeding in the Newborn. Seitz¹ contributes an illustrated paper in which he reports the case of a child born in tedious labor through a contracted pelvis, and in asphyxia. The child was revived and cried, but developed convulsive movements in the arms, legs, and face, and died thirty-six hours after birth.

At autopsy, a moderate quantity of extravasated blood was found upon the tentorium, and, upon removing the clot, a laceration in the upper portion of the tentorium the size of a small coin, was discovered. There was no blood beneath the tentorium.

In 30 cases of hemorrhage in the newborn, in more than half of them the bleeding was found above the tentorium at the base of the brain over the cerebellum and the medulla. In these cases, a laceration of the tentorium was the primary cause of the bleeding.

In 2 cases bleeding had occurred into the ventricles of the brain, the blood making its way thence into the medulla and spinal canal. These cases are to be distinguished clearly from those of supratentorial bleeding where the clot forms on the convex surface of the larger cerebral mass. In these cases, injury to the tentorium is not present. Minute hemorrhages may occur in the newborn for several days without special symptoms, until the clot is sufficiently large to cause sudden attacks of cyanosis and cramp-like movements of the respiratory muscles, followed by death. When asphyxia develops some time after the birth of the infant, it is usually caused by hemorrhage into the medulla. When the blood-clot forms upon the convexity of the cerebellum, the source of the hemorrhage is usually laceration of the longitudinal sinus, or wounds in the venous channels of the cranial bones. In other cases of cerebral hemorrhage in the newborn, the source of blood is venous stasis in the brain. In cases of difficult birth in face presentation, or where the cord has been wrapped about the child, causing death, such hemorrhages have been observed at autopsy.

The point of especial interest in studying these cases is the result obtained by examining the eye-grounds.

Paul,² in examining 200 newborn children, found retinal hemorrhage in 50 per cent.; of those born through contracted pelvis, in 40 per cent.; of those prematurely born, in 40 per cent.; in 40 per cent. of those born by complicated and prolonged labor; and in 20 per cent. of children moderately developed and born spontaneously without complications. Similar observations are reported by others. In some cases, hemorrhages

¹ Zentralblatt f. Gynäkologie, 1912, No. 1.

² Inaug.-Diss., Halle, 1900.

into the liver, suprarenal capsules, and serous membranes, have been observed in asphyxiated children.

It must be remembered that not every laceration of the tentorium causes profuse hemorrhage. When the laceration is at the border of the upper layer, very small vessels are lacerated with little, if any, bleeding.

Salvarsan in the Treatment of the Newborn. Engelmann¹ reports 6 cases of newborn children showing characteristic signs of syphilis, many of them having pemphigus, treated by salvarsan. In some of these, the Wassermann reaction was negative; in others, positive.

In using this remedy with infants, the subcutaneous and intramuscular injections can very rarely be employed. The intravenous injection is a better procedure, especially with children prematurely born, or but recently delivered. In severe infectious pemphigus, a considerable dose, not less than 0.04 grams, should be given. In less severe cases, a smaller dose is sufficient. Large doses, 0.04 to 0.1 gram, are well born by full-term children.

The remedy is sufficiently successful in the newborn to merit its further trial.

The Wassermann Reaction in the Blood of the Umbilical Cord, the Maternal Blood, and the Fetal Blood. Serra and Gentili² contribute an extensive paper upon this subject, containing tables. Their conclusions are that while the Wassermann reaction is often useful in these cases, the detection of the spirochete is a more sure and certain test.

Laceration of the Tentorium in Labor. Pott³ reviews the literature of the subject, and reports 31 cases, with autopsy findings.

It is interesting to observe the frequent occurrence of this accident in all newborn children dying soon after birth upon whom an autopsy was obtained. In children as old as six months, evidences of hemorrhage into the dura are often found. Laceration of the tentorium is usually one of three sorts: The most severe lesion is a transverse tear in the free border, often occurring on both sides, the borders of the laceration being covered with thick clots. The source of the bleeding is the abundant venous supply of this region. The blood flows both upward and downward, the larger portion clotting above the tentorium and much of the blood making its way forward or upward upon the occipital lobes. Less frequently the blood flows upon the medulla and makes its way into the spinal canal. The clot may be 1 cm. in thickness near the point of rupture. Less severe lacerations occur in the upper portion of the tentorium with much less hemorrhage, the blood usually clotting above the tentorium. The least severe of the lesions, and that

¹ Zentralblatt f. Gynäkologie, 1912, No. 3.

² Annali di Ostetricia, 1911, No. 12.

³ Zeitschrift f. Geburtshülfe und Gynäkologie, 1911, Band lxi, Heft 3.

most often observed, is extravasation of blood at the falx cerebri between the layers. In these cases, subdural bleeding may be absent or very slight. Such hemorrhage may produce practically no symptoms.

In 60 per cent. of the cases observed, the labor had been severe. Contracted pelvis, the use of forceps, placenta prævia with version, vaginal Cesarean section, prolonged expulsive period, and disproportion between pelvis and child, were all observed. Birth in breech presentation was especially apt to produce this lesion, and forcible extraction of the head was often followed by severe bleeding. In 40 per cent., labor had been apparently normal. Even prematurely born children did not escape, and in one case this lesion was found in a four months fetus.

It must be concluded that each period of birth and each operative manipulation can produce this injury. Prolonged labor is especially dangerous if the head be long subjected to pressure in a narrowed birth canal.

Laceration usually occurs as the result of excessive distention of the falx cerebri in the long axis of the cranium. In these cases the brain is lengthened from before backward, which presses the occipital portion strongly upon the tentorium. The essential condition, however, is pressure brought to bear upon the falx, which must often result when the cranium is elongated during birth. Strong labor pains may produce laceration by this means. The result of laceration is hemorrhage, usually proceeding very slowly, and under no great pressure from the forces of the circulation. As the blood is venous in many cases there is not sufficient pressure to produce symptoms. Should intense venous stasis develop, the bleeding becomes more severe in proportion to the extent of the laceration and the duration of the pressure. Asphyxia apparently develops in these cases, although in some cases of asphyxia no anatomical cause for the condition can be demonstrated. In cases which recover, the laceration in the tentorium heals with but very slight evidence of scar in two or three weeks after birth. The remains of the hemorrhage can be found in a brown staining of the tissues with hematoidin at varying periods after labor.

It must not be forgotten that this accident may result from violent efforts at resuscitation in asphyxiated children.

Hydrops Fœtus Universalis. Fischer¹ reports the case of a multipara, aged thirty-one years, and healthy, who, during her second pregnancy, complained of frequent pain in the right side of the abdomen upon exertion. There was repeated hemorrhage in no great quantity, which persisted for some time. Tuberculosis, syphilis, rheumatism, and alcohol could be excluded. The mother had never had icterus or swelling of the lower extremities. The Wassermann reaction was negative.

¹ Zeitschrift f. Geburtshilfe und Gynäkologie, 1911, Band lxix, Heft 3.

When the membranes ruptured, it was observed that the quantity of amniotic liquid was not excessive, although the uterus was greatly distended. The fetus was universally dropsical, and there was a presentation of the right arm and shoulder, with transverse position. The child was delivered in vertex presentation after the arm had been replaced and cephalic version performed. The child had recently died *in utero*.

As there was moderate bleeding, the placenta was immediately delivered by Crede's method. The hemorrhages which occurred had resulted from laceration and separation of the placenta, as the umbilical cord was unusually short. The placenta contained no infarcts, nor was it especially edematous. The fetus was strongly kyphotic and universally dropsical.

In attempting to ascertain the cause of this condition, illness of the mother could be excluded. Fetal nephritis and disorders of the blood and blood-producing organs in the fetus could also be excluded. An umbilical hernia of considerable size was present. The placental tissue was hyperplastic.

The Relation between Asphyxia and Difficult Labor, and the Subsequent Disorders of the Nervous System. Hannes,¹ from studies in the clinic at Breslau, concludes that unless a child displays symptoms of injury of the nervous system within the first few weeks of life, diseases of the nervous system do not subsequently develop necessarily because the child has been born asphyxiated, or by difficult delivery.

Chondrodystrophia Foetalis. Basset² publishes, with abundant illustrations, an interesting case of this sort.

The mother had borne five children previously in spontaneous labor without accident. During her last pregnancy she complained of headache and giddiness, but went to term, the child being expelled spontaneously very rapidly and suddenly. The child lived for one-quarter of an hour after birth.

In studying the skeleton the characteristic lesions of the condition were present. Fetal rachitis could be excluded, and the lesions found consisted in lack of development of the skeleton through deficient formation of bone corpuscles and premature ossification of the cartilaginous tissue.

The Treatment of Asphyxia in the Newborn. Ahlfeld³ describes his treatment of asphyxia in the newborn. The umbilical cord is tied and cut so soon as symptoms of asphyxia develop. The child is immediately placed in a hot bath, and, after the child has been cleansed, fresh hot water is added to the bath, the temperature being 38° to 40° C. During the time that the child is in the bath the physician can determine whether he is dealing with a living, dying, or dead child; whether the child is

¹ Zeitschrift f. Geburtshilfe und Gynäkologie, 1911, Band lxi, Heft 3.

² Ibid., Band xxxiii, Heft 5.

³ Ibid., Band lxxviii, Heft 1.

normally developed, malformed, or diseased; whether premature, and whether but slightly asphyxiated, or very deeply asphyxiated. He must also determine whether the air passages are free or occluded.

It must not be forgotten that a newborn child may be dead and that still the heart may beat. To free the air passages, it is usually sufficient to gently but thoroughly wipe out the mouth and throat, and to cleanse the nostrils with gauze or cotton. If the child breathes noisily, it should be suspended by the legs and the mucus and meconium allowed to make their way out of the mouth and nose. If this is not sufficient, the child should be wrapped in a hot towel placed upon a table, a flexible catheter introduced into the trachea, and the mucus removed by aspiration. Further treatment consists in irritating the skin by gently but quickly slapping the child with hot towels and again placing it in the hot bath. The forcible blowing of air into the lungs through the catheter, and swinging by Schultze's method, will often stimulate the action of the heart, but rarely produce respiration. The swinging should not be practised in feeble and deformed children, and in those severely injured during labor. It should be avoided in cases where there is a suspicion of cerebral injury. The injection of warm water into the bowel is sometimes useful. If the heart cannot be made to beat in half an hour's treatment of this sort, the case is usually hopeless.

Schultze¹ replies to Ahlfeld's criticism of his method. Schultze believes that when asphyxia is very slight, the best method of causing the child to breathe is by the application of cold to the skin. A spray of cold water with light rubbing is usually sufficient. If the child breathes and cries, the cord should not be tied until its pulse has ceased. If several minutes elapse without respiration, the cord, although pulsating, should be cut, a little blood allowed to escape, and the cord tied; the child placed in a warm bath, and cold water applied by spray to the skin.

Injury to the Fetus by Extraction in Breech Presentation. Thies² reports the case of a child in breech presentation, the mother being an old multipara, in whom the child was extracted by a sling passed over the thigh. The extraction was forcible, and produced a deep laceration in the mother and a perineal tear in the child.

This effort was made outside the hospital, and when the patient was admitted she was readily delivered by bringing down the foot.

Fetal Dropsy. Lieven³ describes a case of fetal dropsy, and concludes from his examination of the body of the child, that the condition arose from swelling and degeneration of the epithelia of the urinary tubules. There was also a well-marked cell infiltration and hemorrhage in the vessels of the kidney.

¹ Zeitschrift f. Geburtshülfe und Gynäkologie, 1911, Band lxxviii, Heft 3.

² Zentralblatt f. Gynäkologie, 1911, No. 10.

³ Ibid., No. 22.

Nyhoff¹ reports 2 similar cases, and reviews the literature of the subject. He finds that we have no definite knowledge as to the period of pregnancy in which this dropsy of the fetus and membranes develops. In many cases the condition seems to rise rapidly, and seems to be an acute process, dependent upon the formation of toxins in the placenta, with corresponding injury to the epithelia of the fetal kidney.

The Determination of Fetal Age by a Graphic Method. Zangemeister² publishes charts with shaded outlines, showing the length, weight, size of the liver, kidneys, lungs, heart, brain, spleen, and placenta of various periods of development.

By comparing the conditions found in the body of the fetus with these charts, its age is readily determined.

Resuscitation of the Stillborn. Champneys³ believes that blue children born asphyxiated practically all recover, while the pale child will die unless properly treated, and often in spite of proper care. If a child is simply blue and the heart beating well, very often nothing more is required than to clean the mouth thoroughly. In blue asphyxia the reflexes are not lost and stimulation of the surface is often all that is required. In pale asphyxia the condition of the pupils is an important sign. The more pronounced the asphyxia the more widely dilated are the pupils.

The proposal to allow the blood to escape from the umbilical cord is considered irrational and harmful. To remove foreign bodies from the air passages the child should be placed upon its back, with the head hanging over the edge of the table, the mouth gently wiped with soft material, while the thorax is pressed upon with one hand and the trachea stroked upward with the other, retaining the finger at the top of the trachea. The mucus will gravitate toward the posterior nares. If gauze be placed over the child's mouth and the physician blows gently, the mucus will be blown out of the nostrils. The finger held at the top of the trachea prevents the mucus from passing into the chest. It is occasionally necessary to pass the catheter into the trachea. If this goes three and a half inches from the lips it will be below the glottis and above the bifurcation. The chest should be compressed with one hand while the operator blows down the catheter, causing an up-draft into the trachea, which will empty it of mucus. If the child is premature and the trachea collapsed, the catheter should be passed and secured by an elastic band. To excite the circulation the passage of air into the lungs is usually sufficient. Pressure over the precordia directly stimulates the heart and raises the blood pressure. To secure the entrance of air into the lungs those methods which cause pressure on the thorax and which are useful in adults are useless in children.

¹ Zentralblatt f. Gynäkologie, 1911, No. 22.

² Zeitschrift f. Geburtshülfe und Gynäkologie, 1911, Band lxix, Heft 1.

³ British Medical Journal, October 21, 1911.

The only benefit following their use comes from compression of the heart.

In employing Sylvester's method the arm should be brought outward and seized above the elbow. The disadvantages of the method are that the escape of the fluid from the air passages is not favored by the supine posture, and that the mode of respiration is unlike that naturally exhibited by infants. A large quantity of air, however, can be introduced into the lung by this method, combined with hard pressure.

Schultze's method requires also care that the whole body of the child be supported by the fingers under the arms, and that the body is only steadied and not grasped. Practically, it often does secure the entrance of air into the lungs when other methods fail. It also produces descent of the diaphragm and fluid escapes from the air passages more readily. Direct inflation, if not done carefully, may rupture the lungs. There is also danger of tuberculous infection, and danger of inflating the stomach, although this is largely imaginary. In some cases, rhythmical traction upon the tongue may be successful.

It is important in these cases that the operator should not hurry but should take abundant time to study the case. An accurate diagnosis as to the degree of asphyxia, if the child be living, should be made. If the heart beats even very slowly and feebly life is still present. The beats may be separated by very long intervals and the obstetrician should feel the precordia for at least a minute to determine the existence of the heart beat. Where the lungs are occasionally inflated by Sylvester's, or other methods, between the inflation, irritation down the spine may be useful, or other methods of exciting irritation upon the skin.

Nervous Influences in the Causation of Nevi. Fitzwilliams¹ has analyzed the cases of 700 children to determine the question of nervous influence in the production of nevi. He finds that females are more frequently affected than males, that nevi are almost always present at birth, while very few appear at a later date, spider-marks and deeply seated nevi being the chief exceptions to the rule. Nevi usually start on the surface and less often in the deeper tissues. If there is extension, the growth seems to be intimately connected with the nerve supply of the part.

By observation it was found that growing nevi tend to spread along the course of the nerves. This is best seen in cutaneous nevi, but also in the mixed variety. Occasionally a scattered nevus extends along the flank in exactly the same manner as herpes zoster. Nevi often begin at situations where the nerves become cutaneous at the site where lateral cutaneous branches are given off, and near the middle line

¹ British Medical Journal, September 2, 1911.

where the anterior perforated branches come to the surface; 22.3 per cent. of the cases observed showed this condition.

Large portions of the three divisions of the fifth nerve are often marked by the development of nevi and nevoid growths. At first it is most characteristic, being confined to the frontonasal process, the forehead, inner canthus of the eye, tip of the nose, nasal septum, and nostrils. Instances where the nevus has grown across and not along the nerve are seen at flexures of the joints, in front of the elbow, and behind the knee. The influence of the nerves is much more important in the development of nevi than of the vessels.

DISEASES OF THE NERVOUS SYSTEM

BY WILLIAM G. SPILLER, M.D.

DISEASES OF THE BRAIN

Tumor of Brain. MALIGNANT CHORDOMAS Jelliffe and Larkin¹ have found to be rare tumors. The case they report is the seventh fatal case found in literature. In 3 of the cases, the growth extended into the nasopharynx, in 1 case relieving pressure by such an escape, and permitting a diagnosis *intra vitam*. Jelliffe and Larkin urge the desirability of thorough nasopharyngeal examination in all suspected brain tumors, especially when the symptom picture is so strikingly similar as it is in the cases of chordoma reported by Grahl, Frenkel, and Bassal, and their own case.

In their case, a woman, aged thirty-six years, suddenly developed sixth-nerve palsy on the left side. She then had headache and pains in the region of the left fifth nerve, then total internal and external ophthalmoplegia and signs of pressure on the optic tracts, with blindness first in one eye and then in the other. These symptoms indicated the presence of a foreign body pressing upon the structures at the base of the brain. The symptoms increased, and death resulted. The microscopic detail of the tumor at first sight was not unlike cartilage in some places and mucous tissue in others. Rows of cells were embedded in a homogeneous matrix, looking somewhat like cartilage, but in the more developed parts the tissue was identical with the tissue of the notochord. Beautiful colored plates make the description understandable.

Jelliffe and Larkin say that in reality chordomas are not rare tumors. Ribbert and Steiner, in 1894, reported on 12 cases. Ribbert has made the statement that 1 in 200 tumors are chordomas, but malignant chordomas are extremely rare. A summary of all the cases reported, with the neurological findings, is given by Jelliffe and Larkin, as there is no available English neurological literature upon the subject.

CARCINOMA OF THE BRAIN. It is important to recognize that cerebral symptoms may occur without detectable lesions when carcinoma exists in some part of the body, and the cerebral symptoms may even have a focal character. Oppenheim reported a case of gastric carcinoma in which were almost complete aphasia and right hemiplegia, and yet

¹ Journal of Nervous and Mental Disease, January, 1912, p. 1.

no microscopic or macroscopic lesions could be found. Lissauer observed a case of carcinoma of the cecum with symptoms of tumor of the posterior cranial fossa. Microscopic examination revealed general carcinomatous infiltration of the pia of the brain, but not more intense in the posterior part than in the anterior part.

The explanation of toxic action has been widely accepted for these cases in which nervous symptoms exist without metastasis, and has been employed also for the mental symptoms. It must not be supposed, however, that all symptoms of implication of the brain can be explained as toxic when carcinoma has developed in some part of the body. Metastasis of the brain has been found repeatedly, and a case of this character is described by Girardi.¹

DISPLACEMENT OF PARTS OF THE BRAIN FROM BRAIN TUMOR. The displacement of the cerebellum, pons, and medulla oblongata, which occurs with tumor of the posterior cranial fossa, may be considerable, and possibly is one cause of death after operation. I² have recently called attention to two forms of displacement of the cerebellum, viz., the lateral displacement, in which the cerebellum is nearly at a right angle with the brain stem; and the upward displacement, in which the tentorium is much distended and the occipital lobes are widely separated by the dislocated cerebellum.

Lateral displacement is not so common as upward displacement. Either form of displacement probably has some effect on cranial nerves. In some instances, symptoms have been observed indicative of a lesion on the side opposite to that occupied by a basal tumor. An explanation has been sought in pressure upon the medulla oblongata on the side of the tumor, below the motor decussation, or in pressure of the pons and medulla oblongata of the opposite side against the base of the skull, or, more recently, by Oppenheim, in the constriction of the medulla oblongata by the tightly stretched vertebral artery. Oppenheim has considered it possible that in lateral displacement of the pons and medulla oblongata, the pyramidal tract on the convex side of the arch, *i. e.*, the side opposite to the tumor, may be more damaged. I am not aware that anyone has referred to stretching of cranial nerves on the side opposite to the tumor by the displacement of the pons and medulla oblongata from the median line in the direction of the tumor by a dislocated cerebellar lobe, or to pressure on the contralateral side of the pons by the displaced cerebellar lobe.

PARIETAL LOBE TUMOR. The symptoms of tumor of the parietal lobe are sufficiently positive to justify a diagnosis. Quite a number of cases, like that described by Kato,³ can be found in the literature. In his case, a man began to have slight weakness of the right lower limb,

¹ *Monatsschrift für Psychiatrie und Neurologie*, February, 1912, p. 184.

² *Brain*, 1911, vol. xxxiv, p. 29, Part 1.

³ *Deutsche Zeitschrift für Nervenheilkunde*, vol. xlii, Nos. 1 and 2, p. 128.

then he observed uncertainty in the use of the right hand and sensation of numbness in the right lower limb, and the sensory palsy extended to the whole side of the body, affecting the temperature and pain sensations in less degree. Astereognosis, bilateral papillitis, occasional paraphasia, severe headache, vomiting were later symptoms. At the necropsy, an endothelioma was found in the left parietal lobe and posterior central gyrus. Sensory disturbances, such as those described in this case, are very suggestive of parietal lobe lesion.

PSEUDOTUMOR. Meningitis serosa of Quincke, or pseudotumor of Nonne, often are difficult to distinguish clinically from brain tumor, and the causes of these disorders resembling tumor are often uncertain. Otto Maas¹ has attempted to show that lead may be a cause, and he reports one case with necropsy. Optic atrophy, headache, vertigo, and vomiting may result from lead intoxication, and this grouping of symptoms may arouse a suspicion of brain tumor.

TUMOR OF CORPORA QUADRIGEMINA. A tumor of this region of the brain causes often distinct symptoms. In Hoppe's² case, they were double vision, staggering gait, falling to the right, gradual loss of vision, ending in three to four months in total blindness, sudden attacks of rigidity in all muscles, falling to the ground without loss of consciousness, atrophy of optic nerves, no light response of the pupils, all movements lost in the left eye except downward movement, all movement lost in the right eye, except inward and downward movement, slight ptosis of both lids, and extreme static ataxia with retropulsion, so that the patient was finally unable to walk at all; hearing and motor power and sensation were not affected.

TUMOR OF THE FOURTH VENTRICLE. In discussing operation in cases of tumor of the fourth ventricle, Anton³ recommends that the pressure on the parts of the brain within the posterior cranial fossa should be relieved by puncture of the corpus callosum. Tumor of the fourth ventricle or of the corpora quadrigemina may lead to occlusion of the ventricular space and damming up of fluid within the lateral ventricles. Much of the pressure that causes displacement of the cerebellum and pons into the foramen magnum is produced by the fluid in the distended third ventricle, and may be removed by the puncture. Many tumors of the fourth ventricle have slight connection with the floor, and grow from the roof of the ventricle, and, therefore, are removable.

Thickening of the skull about the posterior cranial fossa can be shown by the x-rays, and in this way agenesis or atrophy of the cerebellum may be detected. Where such atrophy of the cerebellum exists, the skull about the cerebrum will be found to be thin, and this

¹ Monatschrift für Psychiatrie und Neurologie, September, 1911, p. 207.

² Journal of Nervous and Mental Disease, February, 1912, p. 108.

³ Archiv für Psychiatrie, vol. xlviii, No. 2, p. 523.

is to be regarded as a result of compensatory hypertrophy of the cerebrum. This condition of the brain may be detected by means of the x -rays in Friedreich's ataxia.

CYST CAUSING AGRAPHIA. Agraphia is seldom a prominent symptom except as a part of a syndrome. C. M. Campbell¹ has studied a case, which, in connection with similar cases in the literature, seems to support the view of a graphic centre in the frontal lobe. The agraphia was present as a comparatively isolated symptom in an early stage of the patient's illness, and even when the syndrome became complicated by difficulty in finding words, and in responding to more complicated spoken commands, the agraphia was out of proportion to the other symptoms.

A cyst was found in the left frontal region. Campbell believes his case shows that the function of writing may be seriously interfered with by a lesion which at the same time interferes in a special way with the utilization of the right arm, not in the way of an apraxia.

VISUAL FIELDS IN BRAIN TUMOR. Cushing and Heuer² return to the subject of dyschromatopsia (interlacing of the color fields) as a valuable sign of brain tumor, and consider it in its relation to the various stages of choked disk. Of 123 cases in their series in which perimetric observations could be made, 53 showed color interlacing or inversion with more or less constriction of the field boundaries. In 10 of the 53 cases, the dyschromatopsia either preceded any recognizable ophthalmoscopic change in the eye grounds or accompanied most incipient stages of choked disk. These distortions of the color boundaries, they think, promise to be of some service in the making of a more precocious diagnosis of an increase of intracranial tension than is commonly attempted. In a number of cases of early tumor, extirpation, color inversion and interlacing, in addition to attacks of Jacksonian epilepsy, were the only clinical signs of the lesion. Until the perception for colors is completely lost, they find that inversion or interlacing is often apparent, even in the greatly constricted color peripheries characterizing the advanced stages of choked disk.

Though permanent achromatopsia is usual, they state that total loss of vision is by no means inevitable, even when the process has advanced into Gunn's fifth stage.

BRAIN PUNCTURE. Brain puncture is practised frequently by certain German neurologists in order to discover the presence of tumor as well as of blood, pus, and cystic fluid within the skull. Pfeifer³ has recently called the attention of the English neurologists to the procedure. Neisser and Pollack, in 1904, showed how the puncture should be made. In one case they were able to cure a patient by puncturing

¹ Review of Neurology and Psychiatry, June, 1911, p. 287.

² Journal of the American Medical Association, July 15, 1911, p. 200.

³ British Medical Journal, September 30, 1911.

a cyst in the cerebellum several times and withdrawing the fluid. In another case they succeeded in extracting soft material mixed with blood and yellowish fluid, which, on microscopic examination, was found to contain large endothelial cells, and a diagnosis of a softened tumor of the brain was made.

Pfeifer uses borers, 3 mm. broad at the point, and the borer, made to revolve by electricity, is forced through the scalp and skull. A silver wire is kept inside the borer until the dura is reached. If there should be a suspicion that blood or pus is outside of the dura, the syringe may be used to withdraw some of this fluid; if not, the needle with the silver wire must be pushed through the dura into the cortex of the brain and the syringe then employed. The needle is inserted slowly into the brain, the gradations on the needle being watched, usually to a depth of 3 or 4 cm. Pfeifer by this method can withdraw cylinders of brain or tumor several centimeters in length and at least 1 mm. in diameter. These pieces of tissue often show macroscopically pathological ingredients. When they are embedded in paraffin and cut in series, the histological diagnosis of tumor or other pathological process can be made with certainty. On performing further punctures in the environment of the place in which the tumor was discovered, an estimate of its size and its distance from the surface of the brain may be obtained.

The operation, when a local anesthetic is employed, is almost painless. General narcosis is not necessary. Some years ago Pfeifer referred to 16 cases of tumor of the brain in which it was possible, by means of puncture, to disprove a wrong clinical diagnosis, or to correct a doubtful one. In one case, it was possible to diagnosticate a cysticercus. In several cases hydrocephalus has been discovered when cerebrospinal fluid was found only a short distance from the surface of the brain escaping very rapidly.

Because of earlier diagnosis of tumor made possible by means of puncture, the entire removal of tumors has been more successful. The operation is not without risk. Pfeifer saw slight hemorrhage result in a few cases and death in one case, caused by injury to the artery of the corpus callosum, the position of which was altered by a tumor. The bleeding was slight, but as a large tumor was present, the hemorrhage was sufficient to cause death. The danger of puncturing the brain with injury of vessels, or infection of normal parts of the brain by the needle piercing an abscess, must be remembered. There is a difference of opinion as to whether surgeons or neurologists should perform the operation. Oppenheim thinks that too many punctures performed on one person may alone damage the brain without causing bleeding or infection. When no more punctures are performed than are deemed absolutely necessary, the operation meets with general approval in Germany.

Associated Lateral Ocular Movements. The mechanism of the associated movements of the eyes has been a disputed subject many years. Marina¹ has carried out an important experimental investigation on the associated lateral and the convergent movements of the eyeballs. From the work he did in 1903, and from that done recently, he has demonstrated that in animals various muscles may be substituted by operation for those which cause the lateral movements of the eyeballs, and that so soon as the post-traumatic symptoms have disappeared the voluntary and the automatic associated lateral and convergent movements are still performed. By automatic movement in this connection, Marina understands the movement of the eyeballs in following a moving object of fixation. From the fact that convergence occurs after the substitution of the internal rectus by a muscle not supplied by the oculomotor nerve, such as the superior oblique or the external rectus, it is evident that in apes neither a supranuclear nor a nuclear centre for convergence exists. From the fact that lateral associated movements occur after the substitution of muscles so that those performing the movement are the two internal rectus muscles, or the external rectus and a superior oblique, or an internal rectus and a superior rectus, or the two external rectus muscles, it is evident that in apes neither a supranuclear nor a nuclear centre for the lateral movements of the eyeballs exists.

These are certainly surprising statements, but Marina does not stop here, but considers the equally important subject of association tracts. It would seem that there must be association tracts between the two oculomotor centres for convergence, and between the abducent nucleus of one side and the opposite oculomotor centre for the lateral movements. Marina's investigations teach that whatever this mechanism may be, it has no fixed function, inasmuch as by transplantation a muscle may rapidly be made to perform a function that it never previously had in the animal or in the ancestors of the animal. Marina raises the important question as to whether the anatomical tracts for ocular movements in the ape are definite when the functional tracts are not, and to this question he gives a negative reply. His investigations do not include the projection tracts from the cortex to the nuclei. He warns against applying too strictly to man the results obtained in the ape, nevertheless they appear to be of great importance.

Aphasia. Aphasia may be caused by a lesion of the right cerebral hemisphere in a right-handed person, as shown by a case studied by Kurt Mendel.² A patient of his who always had been right-handed became suddenly paralyzed on the left side of the body and aphasic. The left cerebral hemisphere was entirely normal, but softening was found in the right third frontal and first temporal convolutions and

¹ Deutsche Zeitschrift für Nervenheilkunde, vol. xlv, Nos. 1 and 2, p. 138.

² Neurologisches Centralblatt, February 1, 1912, p. 156.

the island of Reil. No person in this family had been left-handed and the patient had been right-handed as a child and was not what the French have called a "gaucher corrigé," *i. e.*, a left-handed person by birth who had learned to use the right hand. Mendel refers to cases of similar character reported in the literature but his own is the most satisfactory evidence we as yet possess that occasionally a right-handed person may have the speech centres located in the right hemisphere.

Hemiplegia. An interesting summary of recent signs of organic hemiplegia appears in the *British Medical Journal*.¹ The subject is of medico-legal importance. Babinski's sign is well known. Hoover's sign is that when a patient with organic hemiplegia is asked to try to raise the paralyzed limb from the bed, he presses with the heel of the sound foot on the mattress, as can be felt if the hand of the observer be slipped under the heel when the patient is asked to perform the movement. In simulated or hysterical paralysis this pressure of the heel is absent.

Lhermitte has found that if a partially paralyzed hemiplegic patient tries to raise his arm, the fingers are extended and abducted like the sticks of a fan. Also, when the fingers are passively extended, the thumb is spontaneously flexed. Also, when the elbow rests on the table and the hand is raised by an observer to a vertical position, if the support be removed the partially paralyzed hand drops to an angle at the wrist. Again, if the patient be lying on his back with his feet together, and is asked to abduct the sound leg, the paralyzed leg will be found to be slightly abducted too.

Neri has observed that when the patient is lying on his back the sound leg can be raised from the bed to an angle of 70 to 75 degrees, but the paralyzed leg only to one of 40 or 45 degrees. Also, if a patient be lying on his back with both hands stretched in front of him lying prone upon the bed clothes, the observer slips his hand under the forearm of the patient and flexes the forearm upon the arm without touching the patient's hand, the hand on the healthy side preserves its original place; it remains prone, with its long axis parallel to the axis of the body; but the hand on the paralyzed side becomes partially supinated, its long axis being more or less transverse to that of the body. He explains this as the result of the hypertonicity of the supinator muscles.

HEMIPLEGIA AFTER CONFINEMENT. We know very little about the occurrence of temporary hemiplegia after confinement. The 2 cases reported by Hugh Gillies² are therefore an important contribution. In the first case, the patient, nearly a month after her confinement, had a convulsion. This was followed by left hemiplegia and conjugate

¹ *British Medical Journal*, January 13, 1912, p. 96.

² *Ibid.*, January 27, 1912, p. 180.

deviation of the head and eyes. Complete recovery occurred within a month except in the thumb. The second case was similar except that the paralysis lasted only three days. The symptoms could hardly have been caused by an apoplexy or embolism. The good health of the patients, the absence of albumin and of all other signs of kidney disease, made uremia improbable. The author thinks both cases were caused by spasmodic contraction of the cerebral arteries, such as is known to occur in migraine, in which the retinal arteries on ophthalmoscopic examination may be seen as thin threads.

DEVIATION OF THE TONGUE IN HEMIPLEGIA. Ernest Jones¹ has studied 313 cases of hemiplegia for the purpose of estimating the nature and relative frequency of the various deviations of the tongue, especially the lateral deviation on protrusion and the ability to put the tongue into either cheek. Slight variations from the normal were ignored, which explains the finding of lateral deviation in only 46 per cent. of the cases, and yet one is surprised to read that Jones, in 313 cases, found the tongue protruded toward the paralyzed side only in 104, *i. e.*, one-third of the cases, especially as Oppenheim remarks that deviation of the tongue is an almost constant symptom of hemiplegia. Jones states that a lesion in one cerebral hemisphere may not only fail to cause deviation of the tongue, but may cause a deviation in the reverse direction to the usual one, *i. e.*, away from the paralyzed side. This observation has been ignored in monographs dealing with the subject and written by most eminent men. Jones, in his series, noticed this atypical deviation in 40 cases, *i. e.*, over 12 per cent. of the total number. He found that, in testing the weakness of the tongue while it was in the mouth, an appreciable difference between the two sides was noted in 88 cases out of 313, *i. e.*, in 28 per cent. Of these, the weakness was on the paralyzed side in 67 cases, and on the healthy side in 21. The former he designates as "typical intrabuccal lateral paresis," because it is the rule that there is a deficiency in the power of putting the tongue into the cheek of the hemiplegic side. Symmetrical bilateral weakness was present in a much larger number of cases, and it amounted to a complete paralysis in 8 of them. In one-quarter of the cases, the intrabuccal lateral paresis was of the atypical type. The two atypical forms of paralysis (intrabuccal and extrabuccal) did not usually occur in the same person.

TYPHOIDAL HEMIPLEGIA. Hemiplegia from typhoid fever is not common, but it does occur. This subject has been considered recently by E. M. Williams.² The male sex was more often affected (70 per cent.) in 40 cases in which the sex was given. Where the side involved was mentioned, left hemiplegia occurred in 19 (44 per cent.), and right hemiplegia in 24 (56 per cent.). In 28 cases of right-side involvement,

¹ Journal of Nervous and Mental Disease, October, 1911, p. 577.

² American Journal of the Medical Sciences, May, 1912, p. 677.

aphasia was noticed in 23 (82 per cent.). The paralysis occurred before the age of ten years in 9 instances (24 per cent.), before twenty in 10 cases (26 per cent.), and before the age of thirty years in 19 (50 per cent.). Of the cases in which the time of onset was given, 10 (24 per cent.) occurred in the first and second week, 8 (20 per cent.) during the third week, 4 (10 per cent.) during the fourth, 15 (40 per cent.) during convalescence, and 2 (5 per cent.) so late after the attack as to render the dependence of the condition upon typhoid rather doubtful. Hemiplegia occurs in typhoid more frequently in males because typhoid is more common in males, and also because males through excessive venery and abuse of alcohol and tobacco are more subject to such vascular changes as predispose to a thrombotic process. Williams thinks the pathological condition is usually thrombosis, and this lesion has been found, and was present in one of the cases reported by him. Other lesions probably are hemorrhage and changes of cerebral nerve cells from toxemia, and when these occur recovery may be almost complete. Three of Williams' cases were clinical, but the fourth was with necropsy and microscopic examination. Softening was found in this case in the distribution of the right Sylvian artery, and typhoid ulcerations were found in the ileum.

Traumatic Hemorrhage. Epidural or subdural hemorrhage may be caused by trauma, but the symptoms may not appear for a few weeks after the head injury, and an incorrect diagnosis is very likely to be made under such circumstances. Two of the most remarkable cases of this character are recorded by A. W. Meyer.¹ A man received a head injury and was unconscious half an hour, but returned to his work the next day and continued working three weeks. During this time he complained of headache. This pain increased and he became somnolent, and had involuntary micturition. Lumbar puncture gave clear cerebrospinal fluid. The patellar and Achilles reflexes on the left side became weak, and Babinski's sign was obtained on this side. The puncture of the brain in the method of Neisser-Pollack in the region of the right centre for the upper limb gave liquid brownish blood. Operation was then performed in this region, and a large subdural clot was removed, but the patient died.

In the second case, a man after a head injury picked himself up, walked away, and returned to work, although he complained of headache and vertigo. Symptoms of intracranial pressure developed very slowly, and hemorrhage was found by operation as in the preceding case. No fracture of the cranium was found in either case.

Abscess of Brain. Horsley² confirms an opinion advanced some years ago by Sir Russell Reynolds, viz., that in cases of chronic otitis media

¹ La Semaine Médicale, November 8, 1911, p. 534.

² Proceedings of the Royal Society of Medicine, Otological Section, February, 1912, p. 45.

the reflexes are not normal on the opposite side of the body. He believes that he can distinguish between abscess and meningitis by the pulse alone. In meningitis, the pulse rate and pulse force always exhibit an irregularity which is not met with in abscess unless the abscess is much complicated. In contradistinction to the irregular and relatively small pulse of a case of meningitis, the pulse in an abscess case is regular and full, and this is not merely a matter of pressure. In abscess the lesion does not usually affect the roots of the vagus as does the meningitic process.

Horsley lays much emphasis on temperature. He believes no one has described a case of meningitis simulating abscess with a low temperature. Low temperature is almost always present in abscess; it may be normal but possibly in these persons the normal temperature is below what it is in most persons.

From the examination of a large number of cases, Horsley is convinced that the meningitis cases show a very edematous, greatly swollen, optic disk in contrast to the very moderately swollen disk in abscess.

Influenzal Meningitis. Within a few months, as pointed out by Flexner,¹ a large number of cases of this disease have been reported. The disease is highly fatal. All but 6 of the 58 cases thus far reported, in which the influenza bacillus has been detected in the cerebrospinal fluid, have terminated fatally. It is more frequent among infants and children than among adults. It sometimes follows on undoubted influenza bacillus infections of the respiratory tract, and sometimes develops independently of obvious disease of that tract. The infection of the meninges probably is always, however, secondary to the respiratory infection. All, or nearly all, cases of influenzal meningitis are examples of bacteriemia, and the bacilli have frequently been cultivated in large numbers from the blood during life or at autopsy.

This disease has been produced in monkeys experimentally at the Rockefeller Institute, and daily injections by means of lumbar puncture of an immune serum prepared at the Institute have been found efficient in rescuing monkeys from death.

Flexner thinks it would be advisable, on account of the severity of the disease in human beings, to apply the serum to the treatment of the spontaneous disease. Every effort should be directed to the making of the bacteriological diagnosis at the earliest possible moment. For the present, the testing of the serum will be confined to a few places in which its effects can be carefully observed and controlled before it is offered for more general use.

Aural Vertigo. The treatment of this condition by lumbar puncture has been tried by Putnam and Blake² in 16 cases. It is about nine years since Babinski's observations on this subject were published.

¹ Journal of the American Medical Association, July 1, 1911, p. 16.

² Journal of Nervous and Mental Disease, September, 1911, p. 541.

Some change in the functional excitability of the labyrinth is caused by lumbar puncture. The best cases for the treatment Putnam and Blake believe are those in which the symptoms do not indicate any great disorganization of the labyrinth or any high degree of middle ear disease, but rather an increase in functional excitability. Sometimes the favorable result is obtained at once, sometimes only after some days. Occasionally a second puncture is required. The amount withdrawn is usually 15 to 20 c.c. The only unfavorable result of the treatment thus far observed is headache. This is only of occasional occurrence, but it may last some days or even a week or more. In one of their most satisfactory cases, this headache was prolonged and severe after the first puncture, with withdrawal of 15 c.c. of fluid, but did not occur after another treatment, one year later, though a larger amount of fluid was taken. Good results were obtained in by far the greater number of the cases, and one of the patients was of very advanced age and showed evidence of much arterial change. The exact mode of action of the lumbar puncture is not certain.

Amaurotic Family Idiocy until this time has been observed only in Jewish children, but J. Turner¹ now reports 2 cases with necropsy, in 1 of which no Jewish blood could be determined. As regards the age, both children were far beyond the limit generally assigned to this disease. His first patient was aged fourteen years at the time of death and his second patient was over five years. In both cases there were points suggestive of syphilis. In regard to the first case, the mother gave birth to ten children, who were either stillborn or only lived a few months, before she gave birth to the patient. The character of the patient's bone lesions was suggestive of syphilis, as was also the proliferation of lymphocytes in the peri-adventitial spaces of the vessels of the brain cortex. Whether syphilis has or has not a causal relation to this disease is uncertain.

Function of the Lenticular Nucleus. Mingazzini,² reaches the conclusions from careful observations that a lesion of the lenticular nucleus causes a slight paresis of the opposite side of the body, with moderate exaggeration of the tendon reflexes of this side, slight anisocoria, and sometimes atrophy of the limbs and mild disturbance of objective sensation (hypesthesia). If the lesion be incomplete and yet implicate the posterior four-fifths of the left nucleus, dysarthria occurs and may become anarthria. If the lesion implicate certain parts of the putamen, especially the outer third, a peculiar paresthesia of one or the other limb of the opposite side may result. By this is meant a sensation of a false position of a limb, or incorrect sensation as to the weight

¹ Proceedings of the Royal Society of Medicine, Pathological Section, February, 1912, p. 117.

² Zeitschrift für die gesamte Neurologie und Psychiatrie, vol. viii, p. 85.

or the movement of the limb, or a sensation of complete paralysis in a limb only paretic.

Progressive Lenticular Degeneration. An exceedingly interesting communication has been made recently by S. A. K. Wilson¹ to the Neurological Society of Paris. It relates to progressive degeneration of the lenticular nucleus, a family disease, associated with cirrhosis of the liver. Wilson says the first 2 cases were described by Gowers, in 1888, under the title of tetanoid chorea. Ormerod described a third case two years later, and Homén nearly at the same time gave the histories of 3 persons of the same family who died from the disease. During more than twenty years which have elapsed, not a case has been reported. The disease consequently has not been well recognized. Wilson has observed 4 cases, of which 3 were with necropsy.

Progressive lenticular degeneration is often familial, but never hereditary, the subjects are always youthful, between the ages of ten and twenty-five years. The physical and mental development is normal. The symptoms appear toward adolescence or puberty, they are usually of slow development but occasionally of acute course. They are entirely in relation to the nervous system, and the motor part of it, especially the extrapyramidal motor tracts. There is bilateral involuntary intentional tremor of the distal segments of the limbs, which increases gradually as the disease progresses, and may become violent during muscular effort. It is usually rhythmic and disappears during sleep or complete repose; it is seldom irregular or choreiform. Wilson has seen the tremor also in the muscles of the neck and trunk.

All the voluntary muscles are in a spastic state, which increases as the disease progresses and may become intense. It is more pronounced in the proximal parts of the limbs, and the appearance of contractures is produced, *i. e.*, the upper and lower limbs are held in the position of hemiplegia, but the legs, arms, and fingers may be extended voluntarily, slowly, and with difficulty, if the disease has not progressed too far, so that the contractures disappear.

All of Wilson's patients have had persistent contractures finally. The spastic state causes a shortening of the muscles. There is no true paralysis in the ordinary sense of the word. Voluntary movements are slow and feeble, but extension and flexion of all parts of the limbs are possible. Wilson did not see true paralysis in any of his 4 cases until toward the end, when the pyramidal fibers had become involved.

There is always dysarthria, and it is an early and pronounced symptom. It becomes anarthria, and yet the tongue and soft palate are not paralyzed. It is not caused by implication of the fibers in the knee of the capsule, but by rigidity of the muscles of articulation.

¹ Revue Neurologique, February 29, 1912, p. 229; Brain, 1912, vol. xxxiv, p. 295.

The patient occasionally may articulate some words when the spastic condition temporarily diminishes. There is also dysphagia, but no true aphasia. The patient understands what is said to him and can read and write.

Some patients present a curious mental state without real dementia. There is an emotionality simulating spasmodic laughter, and often the mouth is kept open. The cranial nerves are normal, and nystagmus and ophthalmoplegia do not occur. The pupils, the eye grounds, and sensation are normal. The tendon reflexes usually are normal, sometimes they are a little exaggerated, but clonus is absent. In typical cases, the abdominal reflexes are preserved and the plantar reflex is in flexion. The latter finding is important in consideration of the motor symptoms.

Wilson found the same lesions in all 3 of his cases with necropsy, viz., bilateral symmetrical softening of the corpus striatum, especially of the putamen, but also of the globus pallidus in less intensity. The lesion begins as disintegration about the small lenticulostriate vessels, with neuroglial proliferation and cavity formation. The small vessels of the affected region are thinner than normal. The caudate nucleus is slightly atrophied but the optic thalamus and internal capsule escape. This selection of the lenticular nucleus is surprising. Cirrhosis of the liver occurs in all the cases.

In the more acute forms of progressive lenticular degeneration, the duration is from four to ten months; in the chronic cases, it may be five years. Hepatic symptoms are never present, and yet Wilson believes the hepatic cirrhosis is primary and that an unknown toxin of hepatic origin affects the lenticular nucleus. He promises, in a forthcoming article in *Brain*, to discuss this remarkable disease more fully and also its relation to Parkinson's disease.

Thalamic Syndrome. Dejerine and Roussy have described a symptom-complex from a lesion confined to the optic thalamus, and especially the posterior part of the external nucleus. Only a few cases with necropsy have been described. A recent good example is recorded by Holmes and Head.¹ A man had three strokes at short intervals, the last more than two months before his death. There was little or no paralysis, and the reflexes remained normal, but he had severe pains throughout the whole of his right side, associated with almost complete loss of tactile and postural sensibility on this side. The threshold for painful stimuli was much raised, though certain forms of discomfort were more severe. The appreciation of temperature was abolished, as was also the ability to appreciate weight, size, shape, and form. An extensive softening was found in the ventral and lateral regions of the left optic thalamus.

¹ *Brain*, 1911, vol. xxxiv, Parts 2 and 3, p. 255.

As Roussy defines the thalamic syndrome, it consists of hemianesthesia, involving deep sensibility more than the superficial forms, with persistent, paroxysmal, spontaneous pains on the affected side; little or no hemiplegia; hemiataxia, and frequently irregular involuntary movements of the athetoid or choreic type, in the affected limbs.

Involuntary movement has not been present in all the reported cases. Hemiataxia is a more frequent symptom. The sensory loss was greater in Holmes and Head's case than in most of the others, and spontaneous pain and paresthesia are common symptoms. In some of the cases, certain stimuli, generally of an unpleasant kind, have caused more pain and discomfort on the affected side than on the normal side of the body, notwithstanding the diminution of sensibility. Holmes and Head regard this as the most constant and characteristic feature of lesions of the lateral zone of the optic thalamus. In their case partial deafness was present, but ear disease was not excluded. Deafness has been found in other cases, and possibly it may be caused by involvement of the internal geniculate body or the corticopetal fibers from the internal geniculate body as they pass through Wernicke's zone.

Sensory Cortex. A case studied by Karl Schaffer¹ shows that the precentral convolution is purely motor. This convolution alone had undergone softening. Sensory disturbances were present at first but disappeared in the third week after their onset, and were caused by diaschisis, *i. e.*, by disturbance of association. The persisting symptoms were motor.

POSITION OF THE SENSORY TRACT IN THE INTERNAL CAPSULE. There has been much doubt as to the position of the sensory fibers in the inner capsule. The question has important clinical bearings, because on a knowledge of the position of these fibers depends our ability to recognize certain lesions of the internal capsule. In 1902, in association with F. X. Dercum, I had the opportunity to study a lesion causing persistent hemianesthesia. A cyst was found implicating the posterior portion of the lenticular nucleus and the posterior part of the posterior limb of the internal capsule. The optic thalamus was not implicated at any part in the cyst. It seemed, therefore, that the hemianesthesia was caused by this cyst, and the conclusion was warranted that sensory fibers are located chiefly, if not entirely, in this portion of the capsule, although some sensory fibers may pass through the posterior part of the lenticular nucleus. Chance has placed a similar case under my observation,² and it has been recently reported with C. D. Camp. The same conclusions regarding the sensory fibers are warranted by the microscopic study of this case.

Dejerine, and many in association with him, believe that the sensory

¹ *Zeitschrift für die gesamte Neurologie und Psychiatrie*, vol. vi, No. 2, p. 196.

² *Journal of Nervous and Mental Disease*, February, 1912, p. 92.

fibers are mingled with the motor in the internal capsule. If this be true, it is difficult to understand why the cortical representation of motion and sensation is in large measure distinct one from the other. Some recent investigations of Probst justify the conclusion that the sensory fibers are not mingled with the motor in the internal capsule. They certainly are not in the spinal cord, and it seems improbable that they should be so only in a very limited portion of the central nervous system. We cannot conclude, because a unilateral paralysis of motion is slight and the loss of sensation is intense on the same side, that the lesion necessarily is in the optic thalamus.

Congenital and Infantile Pseudobulbar Paralysis. Oppenheim, in 1895, described a form of pseudobulbar palsy, occurring in children, and associated with cerebral diplegia. He had a mother and daughter affected with this disorder as patients. Recently the daughter died and her brain was given to the Vogt laboratory. It was examined microscopically by Cécile Vogt.¹ The macroscopic examination showed nothing abnormal, but the serial sections revealed a marble-like appearance and marked atrophy of the caudate and lenticular nuclei, apparently with enlargement of the internal capsule, but the latter was merely the result of disappearance of the gray substance in the corpus striatum.

Oppenheim concludes that there are two forms of infantile pseudobulbar palsy, one resulting from a lesion of the cortex and one from a lesion of the basal ganglia. The two forms may be combined. Cécile Vogt draws the important conclusion, from a study of this case and another in the literature, that the spasms and athetosis were caused by the atrophy of the caudate nucleus and putamen, and that the regulating and inhibitory organs of speech, mastication, and deglutition are located in the anterior part of the caudate nucleus and the putamen.

Pseudobulbar Palsy is rare in children. Halipré² has observed a case in a child, aged thirteen years. The onset was sudden, and, in addition to the bulbar symptoms, there was paresis of all four limbs. The labioglossolaryngeal palsy was very intense at first. Anarthria was complete, and dysphagia threatened the life of the child. There was no aphasia and intelligence was preserved. Two months after the onset, anarthria, so complete at first that not a word could be articulated, had given place to nasal speech. The paresis of the limbs was greater on the left side, and was associated with left facial palsy of peripheral type. The child had had several attacks of articular rheumatism, and had also mitral endocarditis.

The necropsy was surprising in that the lesion was in the left side of the pons. This explained the left peripheral facial palsy but not the predominance of the weakness in the left limbs. Two small vessels

¹ *Journal für Psychologie und Neurologie*, 1911, vol. xviii. *Ergänzungsheft*.

² *Revue Neurologique*, February 29, 1912, p. 235.

entering the left side of the pons were thrombotic, and an area of softening was found in this side of the pons corresponding to the distribution of these vessels. The predominance of weakness in the left limbs could not be explained by a failure of motor decussation, as decussation occurred. It could not be satisfactorily explained by congestion of the vessels in the right side of the pons. The author takes refuge in a statement made by Brown-Séquard, that in a large number of cases of isolated lesion of the peduncles, pons or bulb above the motor decussation, the paralytic phenomena are greater on the side of the lesion, but no explanation for this is given by Brown-Séquard. This statement in no way explains the condition found in Halipré's case, and one would expect the improved technique since Brown-Séquard's time to make an explanation possible:

Pseudobulbar Paralysis from Unilateral Cortical Lesion. Doubt has long existed as to whether a unilateral lesion may produce pseudobulbar palsy. Oppenheim believes that in exceptional cases, when one hemisphere has excessive functional development, a unilateral lesion may cause pseudobulbar palsy, and now Karl Schaffer¹ reports a case with necropsy in which this form of palsy resulted from a unilateral lesion. The symptoms were left faciobrachial monoplegia, aphagia, glossoplegia, trismus, dribbling of saliva, and total anarthria; and these all developed simultaneously. The middle and lower thirds of the right anterior central gyrus were softened, *i. e.*, the upper limb centre as well as the faciolinguo-laryngopharyngeal centre. This case demonstrates that a single attack producing bulbar symptoms is not always sufficient evidence that the lesion is bulbar in its location, but the lesion may be confined to the Rolandic operculum.

Acute Bulbar Palsy. There is danger that every acute case of bulbar palsy for which no cause can be found will be attributed to the micro-organism of poliomyelitis, as poliomyelitis is now engaging the attention of physicians. Acute bulbar palsy may be caused by diphtheria, as shown recently by Galliard and Donzelot.² A woman, aged twenty-four years, had herpes zoster during two months with severe vomiting, improvement occurred, but the zoster reappeared, and was associated with vomiting, headache, nystagmus, paralysis of the right external rectus muscle, stiffness of the neck and of the lower limbs, tachycardia, etc. Lumbar puncture revealed nothing abnormal. Paralysis of the soft palate developed, and this was soon followed by left facial palsy, trismus, and paralysis of the vagospinal (spinal accessory) nerve. Although no evidence of diphtheria was obtained, the antidiphtheritic serum was administered repeatedly, and soon the symptoms began to disappear and complete recovery occurred.

¹ *Zeitschrift für die gesamte Neurologie und Psychiatrie*, vol. vi, No. 2, p. 196.

² *La Semaine Médicale*, November 8, 1911, p. 539.

Sainton mentioned a similar case. A woman, aged thirty years, eight days after the onset of an angina without any false membrane, presented paralysis of the soft palate, of the left vocal cord, of the ocular muscles, of all the limbs and tachycardia. Treatment with antidipltheritic serum caused all the symptoms to disappear.

Thrombosis of the Superior Cerebellar Artery. A very remarkable symptom-complex is described by Mills,¹ and consists of ataxia of the upper and lower extremities on one side, and, on the other side, deafness, paralysis of emotional expression in the face, and loss of the senses of pain, heat, and cold over the entire half of the body. The symptom-complex is new, and the entire investigation, clinical and pathological, sheds new light, as Mills says, upon the functions of the cerebellum and of the cerebello-rubro-thalamic and cerebello-rubro-spinal systems. From the point of view of blood supply, the syndrome was that of occlusion of the superior cerebellar artery.

The patient, a man, aged thirty-four years, ten weeks before admission to the hospital was suddenly seized with vertigo, accompanied by nausea and vomiting. He was confined to his bed about a week. From the time of his seizure he became awkward in the use of his left hand, could not laugh on the right side of his face, although the expression of emotion was the same on both sides previous to the seizure, and he had a sense of numbness or impaired sensation throughout the entire right half of his body, face, trunk, and upper and lower limbs. He was deaf on the right side. This symptom-complex remained unaltered from the examination of the patient in November, 1907, to his death on October 31, 1911. Ataxia was also present in the left lower limb. Power in both upper and lower limbs was preserved. Sensation in all its forms was retained on the entire left half of the body, but was lost to pain, extreme heat, and extreme cold on the right half of the body; tactile discrimination was also greatly impaired, as shown by the compass test.

The branches of the left superior cerebellar artery were very small, the cerebellum over the left dentate nucleus was depressed, this nucleus was greatly atrophied, the greater part of the superior cerebellar peduncle was degenerated, and the right nucleus ruber was much smaller than the left.

DISEASES OF THE SPINAL CORD

Tabes. JUVENILE TABES. Until the present time only 2 cases in which the diagnosis of tabes in youth was made have had pathological confirmation of the diagnosis; 1 of these was reported by Malling, and

¹ Journal of Nervous and Mental Disease, February, 1912, p. 73.

in his case the symptoms began at the age of sixteen, death occurring at the age of twenty-four. The other case was reported recently by Dejerine, Thomas, and Heuyer. Otto Maas¹ adds another case to this small number. The posterior columns were not equally degenerated in his case, otherwise the degeneration was typically that of tabes. The clinical course was very long. At the thirteenth year, there was disturbance of the bladder; at the sixteenth year, impairment of vision, slight ataxia of the lower limbs, loss of patellar reflexes; at the eighteenth year, complete blindness; at the twenty-seventh year, lancinating pains in the lower limbs; at the twenty-eighth year, diminution of sexual power; and at the thirty-eighth year, increase in the ataxia of the lower limbs. Maas believes the juvenile form of tabes does not differ in the symptomatology from the more usual type. In the latter, also, the course may be very long.

LATE TABES FROM HEREDITARY SYPHILIS. It is noteworthy that tabes may develop late in a person with congenital syphilis. Hösslin² reports a case of this kind. The father died of paresis at the age of thirty-six years. The mother had three miscarriages before the birth of the patient. A brother had convulsions until his death in his seventh year. Necrosis of the skull occurred in the occipital region when the patient, a female, was ten years old. She never had sexual intercourse and the hymen was intact. She had no lancinating pains before her fifty-third year, and was in good health until this age. The diagnosis of tabes was confirmed by the necropsy. From such a case as this one may conclude that a person who has contracted syphilis may develop tabes or paresis at any period after the infection.

TABES IN WOMEN. Kurt Mendel and Ernst Tobias³ have studied tabes as it occurs in women. Twenty-eight per cent. of married tabetic women had never conceived, 31 per cent. were childless from abortions, premature births, stillbirths, or early death of their children. Erb believes tabetic virgins exist, and that syphilis can always be demonstrated in them, either as hereditary syphilis or as syphilis acquired in an extragenital manner. Mendel and Tobias observed 3 cases of tabes in women who were unquestionably virgins, and in all 3 hereditary tabes could be demonstrated. They also found that the average period between infection and the development of tabes was 16.2 years if treatment were not employed.

REFLEX PUPILLARY RIGIDITY IN ALCOHOLISM. Nonne,⁴ in 1908, reported that, in 1460 cases of grave chronic alcoholism which had been under his care from 1905 to 1907, he had seen reflex pupillary rigidity eighteen times produced, as he believed, by alcoholism. In 1907, he examined 9 cases with this phenomenon for pleocytosis and phase I

¹ *Neurologisches Centralblatt*, March 16, 1912, p. 345.

² *Ibid.*, January 2, 1912, p. 23.

³ *Ibid.*, October 16, 1911, p. 11 2.

⁴ *Ibid.*, January 2, 1912, p. 6.

reaction, and found that syphilis by these tests probably was not present. In 3 cases studied later, the Wassermann reaction was negative. Bumke, in his work on the disturbances of the pupil, states that in several thousand investigations of the pupil he has never seen true reflex pupillary rigidity except in tabes, paresis, or syphilis. Weiler investigated 1000 cases of alcoholism, and found that persistent reflex pupillary rigidity does not occur from alcoholism alone. Bumke found that paresis or tabes was not present only in 1.4 per cent. of all cases of reflex pupillary rigidity. Weiler found 8 cases with reflex pupillary rigidity showing no signs of tabes, paresis, or cerebral syphilis, but all presented a positive Wassermann reaction, and, later, 2 of these showed tabes or paresis. He, therefore, concludes that reflex pupillary rigidity occurs only in tabes, paresis, cerebral syphilis, or in persons who have contracted syphilis.

Reflex rigidity has been observed to precede by many years the other signs of tabes or paresis, but, on the other hand, Binswanger, Siemerling, and Nonne have reported the long persistence of reflex pupillary rigidity alone, even so long as twelve or fifteen years. Mobius regarded reflex pupillary rigidity as a proof of tabes or paresis, but this view Nonne does not accept, and believes with Erb that it is not a positive sign of either disease. Erb believes that it is a proof that syphilis has already affected the central nervous system, and this view is shared by many prominent neurologists. Bumke states that the occurrence of reflex pupillary rigidity in a person who has not had syphilis has not been demonstrated.

Nonne now reports a case in which this important sign was caused only by alcoholism. The patient's only sign of disease of the nervous system was bilateral reflex pupillary rigidity, the four reactions of syphilis were negative, and microscopic examination of the spinal cord and macroscopic examination of the brain showed nothing suggestive of paresis. Nonne reports, also, a clinical case in support of the interpretation of the previous one, and still another which shows that reflex pupillary rigidity from alcoholism may disappear when alcohol is discontinued.

The case with necropsy seems to establish the possibility of reflex pupillary rigidity from alcoholism without syphilis, and is of great clinical importance. It seems, therefore, to be demonstrated that, in rare instances, alcoholism alone may produce reflex pupillary rigidity.

GASTRIC CRISES. The division of the seventh, eighth, and ninth posterior thoracic roots for the relief of gastric crises in rare instances may be followed by very grave results, as in a case reported by Heile.¹ In this case, anesthesia developed in all parts of the body below the sixth rib and it was evident that a transverse myelitis existed. The

¹ Münchener med. Wochenschrift, January 16, 1912, p. 129.

gastric crises returned in their former severity in the fifth week after the operation. A necropsy obtained four months after the operation showed that the spinal cord was completely softened at the site of the operation.

The spinal cord was not injured by pinching or pressure, no intradural hemorrhage occurred, and no great amount of cerebrospinal fluid was lost. The cause of the softening was supposed to be the condition of the vessels within the cord, presumably a syphilitic arteriosclerosis. Heile recommends that cases in which syphilitic myelitis is threatened should be regarded as unsuitable for division of the posterior roots. Every experienced neurologist will recognize that Heile's caution is wise, but his suggestion may be difficult to follow.

The reappearance of gastric crises after loss of function below the sixth thoracic segment makes doubtful the supposition that these pains depend on the integrity of sympathetic fibers passing to the spinal cord by the rami communicantes, and indicates that the vagus nerve was at fault. Other cases in which division of the thoracic roots has been effectual in overcoming gastric crises would seem to indicate that two systems of fibers may be concerned in the gastric crises, and that both may not be equally affected in all tabetics.

Paresis. Candler¹ has made a microscopic examination of the brain in 80 cases in which the cerebrospinal fluid was withdrawn during life by lumbar puncture and examined by the Wassermann test. A positive Wassermann was obtained with the fluid of 67 out of 69 cases of paresis, a percentage of 97 per cent. In only 2 cases of paresis did the fluid fail to give a positive reaction before death. In 1 of these, the fluid was negative two months before death, but positive after death. The blood serum in this case, tested three days before death, gave a positive reaction. In the second case, the cerebrospinal fluid gave a negative reaction three months before death. This was the only occasion on which the fluid was examined.

In 6 cases of suspected paresis, in which the Wassermann reaction was negative death occurred, and microscopic examination showed that they were not cases of paresis.

The reaction cannot be obtained in the cerebrospinal fluid in any other form of insanity, except with syphilis of the central nervous system.

In all cases, an excess of lymphocytes in the cerebrospinal fluid indicates organic disease, but not necessarily either syphilis or parasymphilis.

A positive reaction with the cerebrospinal fluid, in conjunction with lymphocytosis, points much more strongly to parasymphilis, especially paresis, than to cerebral or spinal syphilis.

¹ *Lancet*, November 11, 1911, p. 1320.

Every case of paresis is said to give a positive serum reaction, but this merely indicates that the patient has had syphilis. Where there is a positive serum reaction, associated with nervous or mental symptoms, lumbar puncture should be performed, and, if the cerebrospinal fluid gives a positive reaction, the indication is strongly in favor of paresis.

Syphilis of the Nervous System. TREATMENT WITH SALVARSAN. One number of the *Neurologisches Centralblatt*¹ is devoted to nervous syphilis, more especially the treatment with salvarsan. Much benefit has been observed by L. Minor in treating such chronic affections as tabes and spinal syphilis with this new drug. He observed one case in which optic atrophy occurred, but it is doubtful whether it was caused by salvarsan. He mentions that mercury is a dangerous drug in beginning optic atrophy.

The question of cranial nerve disease following salvarsan injection receives special attention in this number. Alfred Saenger states that, in the hospital with which he is connected, nervous symptoms appeared three times in 1000 cases treated with salvarsan. In one case slight ulnar neuritis developed, in another, retrobulbar neuritis, and in another, neuritis of the cutaneous communicans peronei. Saenger and Nonne have not observed any of these complications in their wards after salvarsan injections. It seems probable that these unpleasant symptoms are caused by syphilis and not by salvarsan, but further observation is necessary before this question can be regarded as settled.

Abstracts of papers are given in this number of the *Centralblatt* in which, following salvarsan injections, such conditions occurred as peroneal palsy, sciatic palsy, herpes zoster, and even death. It seems that we have a valuable agent in salvarsan, but one that in rare instances may prove dangerous.

In a very important discussion on nervous syphilis and the use of salvarsan, Nonne² remarked that lymphocytosis of the cerebrospinal fluid occurs in a considerable percentage of persons who have acquired syphilis and yet at the time of examination show no symptoms, and he thinks it is probable that only those syphilitics who still have a lymphocytosis of this fluid after treatment are likely to develop syphilitic disease of the nervous system. It seems to have been shown by a small number of cases that the lymphocytosis may be influenced by antisymphilitic treatment. Lymphocytosis and the globulin reaction (phase I) probably may be employed to estimate the result of treatment in the parasymphilitic diseases, and certainly in the true syphilis of the nervous system. Disappearance of the symptoms in the latter is associated with a change in these reactions to those of healthy persons, and these reactions are positive so long as the symptoms remain.

¹ *Neurologisches Centralblatt*, July 16, 1911, No. 14.

² *Deutsche Zeitschrift für Nervenheilkunde*, vol. xliii, Nos. 3 to 6, p. 166.

Nonne is more conservative than is Horsley as regards operation and does not think the skull should be opened in every case of cerebral syphilis and the brain washed off.

The results of an important discussion, introduced by Redlich, are that tabes may be treated with mercury, and that the treatment may have a beneficial effect on the course of the disease, and Nonne prefers the inunctions. The thorough treatment of the early stage of syphilis lessens the tendency to disease of the nervous system, but does not invariably prevent nervous syphilis.

The evidence at present seems to show that the appearance of nervous symptoms after the use of salvarsan is not due to the drug but to the existing syphilis. Nonne's views on the action of salvarsan are: The drug produces often much quicker and much more extensive effects than do mercury and iodide, and salvarsan may produce favorable results when the other form of treatment has failed. The cases with the astonishing results are in the minority. Usually, only improvement from the use of salvarsan is to be expected, and in some cases the treatment fails. Indeed, occasionally, the salvarsan seems to increase the recurrences and may make the patient worse. Much depends on the character of the syphilitic lesions. The results have been best in the cases diagnosticated as gummatous meningo-encephalitis, but Nonne has seen equally good results in such cases from mercury and iodide. Salvarsan is not superior to mercury and iodide in the treatment of ophthalmoplegia interna or reflex pupillary rigidity, or syphilitic disease of the cerebral vessels.

Nonne acknowledges that he has seen good results in favorable cases from the use of salvarsan, but he has also seen cases where mercury was effective after salvarsan had proved to be useless. He believes that further study and observation are necessary before we shall be able to decide what cases are especially adapted to salvarsan in preference to mercury and iodide.

Tabes does not appear to be much influenced by salvarsan, the so-called active processes may be favorably affected, as the pains, crises, ocular palsies, and ataxia when they develop acutely. It seems to be generally held that salvarsan causes a general strengthening of tabetic persons. Unfavorable symptoms have been observed by some after the use of salvarsan, as increase of paralysis, of pains, and of paralysis of the bladder. Beginning disease of the optic nerve in tabes is not a contraindication for salvarsan. It has not been demonstrated that salvarsan accomplishes more than mercury in tabes.

Salvarsan may be used in incipient cases of paresis, it may be used in the cases in which mercury has been useful, but has lost its power, it is useless in advanced cases of this disease.

The proper dosage of salvarsan in syphilitic disease of the nervous system has not been determined, as opinions vary. Nonne thinks it

is probable that the best method will prove to be repeated small or moderate doses, as the indications for salvarsan and the effects of the drug are in general those of mercury, and experience has shown that repeated small doses of mercury and iodide are better than very large doses. It seems positive that the combination of salvarsan with mercury and iodide is well borne. Nonne prefers in most cases the inunctions of mercury to the injections.

The frequent finding of a positive Wassermann reaction in the near relatives of a syphilitic patient is astonishing.

Oppenheim's experience with salvarsan is very important, and he gives it in the discussion of Nonne's paper. His recent cases have been chiefly those in which the drug had been administered by others. He, therefore, had opportunity to judge of the later results of the treatment, but a disadvantage was in his ignorance of the method of treatment employed, and in the fact that cases in which great improvement occurred did not seek his advice. His conclusions are:

Salvarsan can cure true syphilitic disease of the nervous system, but it accomplishes no more than do the drugs we have; its advantage is in the results of a single dose. It often fails in syphilitic disease of the brain and cord where mercury and iodide have failed. It is uncertain whether its results are more permanent, and in some cases it is injurious. It is of very little use in tabes and paresis; usually it is harmless but occasionally causes damage, in that the course of the disease, after a short period of improvement, may be more rapid and new symptoms may appear. In some cases, it improves the general health. Where the diagnosis of tabes or paresis is positive, Oppenheim believes salvarsan should not be given.

Oppenheim believes that severe symptoms of disease of the nervous system may result from the salvarsan treatment of constitutional syphilis, by which term, I suppose, he means syphilis affecting the greater part of the body, an explanation for this he does not offer. In large doses, it may originate multiple neuritis or increase it if it is already present. He even thinks it is doubtful whether the treatment of nervous syphilis has been greatly advanced by the discovery of salvarsan.

Ehrlich believes the recurrences in nervous symptoms after the use of salvarsan can in no way be attributed to the drug. He emphasizes the importance of using freshly distilled water, as salvarsan is toxic only when in association with living or dead bacteria. He believes it is more difficult to treat nervous syphilis than other forms of syphilis, because the former is a late manifestation and in many cases degeneration has occurred and will continue to develop independently of the syphilis. Those who have nervous syphilis often have other disorders and reduced resistance. He recommends the combination of mercury and salvarsan.

WASSERMANN REACTION. Recent views from Nonne¹ regarding the significance of the Wassermann reaction in the blood are the following: In numerous cases of tabes and general paralysis, the reaction has been positive when no history of syphilis could be obtained. A positive reaction merely strengthens a suspicion of syphilis, and this is important as its value is often overestimated. It indicates that the person probably has contracted syphilis. A negative reaction proves nothing. Tabes gives a positive reaction only in 60 to 70 per cent. of the cases, and a negative reaction may be obtained in some cases of tabes even when a history of syphilitic infection is given. In paresis, the reaction is negative in 5 to 10 per cent. of the cases, and it is negative in about 20 per cent. of the cases of syphilis of the nervous system. In a large number of cases where either husband or wife has had tabes, or paresis, or been infected with syphilis, a positive reaction has been obtained in the other partner, and in the children of the union. Many persons who appear perfectly healthy, but have contracted syphilis at some time, give a positive reaction.

Nonne has not obtained a positive Wassermann reaction in chronic alcoholism.

It has been shown that the Wassermann reaction is positive in the spinal fluid in almost all cases of paresis. Nonne demonstrated that when the original method was employed, using 0.2 cm., the reaction of the spinal fluid is negative in tabes in the great majority of cases; this is true also of cerebrospinal syphilis; but, if more fluid be used, the reaction may become positive in both these diseases.

The positive reaction may be obtained in the blood in some cases of scarlet fever at a certain stage of the disease, in malaria, frambesia, leprosy, plague, etc. Such a reaction is not likely to cause confusion with syphilis.

Multiple Sclerosis. It is of much importance to know that long intermissions may occur in multiple sclerosis, especially as this disease sometimes resembles hysteria. Ninian Bruce and Buist² refer to these facts, and state that remissions are followed after a variable period by relapses, several such improvements and relapses often occurring in the course of the same case. Buzzard has recorded several cases in which the periods of remission were unusually long. A few writers have doubted whether these periods are always followed by relapses, and a few cases have been recorded in which the periods have been so prolonged that the authors have regarded them as permanently arrested or cured.

Bruce and Buist report a case which shows how unfounded such a view may be. The man's first attack, in 1894, was considered clearly one of multiple sclerosis, and his recovery appears to have been com-

¹ *Deutsche Zeitschrift für Nervenheilkunde*, vol. xlii, Nos. 3 and 4, p. 201.

² *Review of Neurology and Psychiatry*, February, 1912.

plete. He had no further attack for a period of seven years, during which time he had undergone all the hardships of forced marches in the Boer War. At the end of this time he had a second attack, not very severe, which appears to have followed exposure to the African sun. He recovered from this quickly, and his next attack did not occur until six years later, during the intervening years he had served in the army and had become one of the best and steadiest shots. This attack in 1907 was more severe than either of the two previous attacks, but he made a partial recovery and returned to work. The length of the periods of remission now diminished, as his next attack occurred three years later and his recovery was only partial. It would not have been surprising if this case had been considered as one of recovery, if it had been observed during one of the long periods of intermission.

Poliomyelitis. Flexner, Peabody, and Draper¹ find that the main injury in poliomyelitis is inflicted on the nervous organs, that the lymphatic organs are affected next, and then the parenchymatous organs. Of the last, the focal necrotic lesions of the liver are especially impressive. Whether the organic lesions, exclusive of those of the nervous system, are to be attributed to parasitic action or to the action of toxic elements of parasitic origin is, at present, a matter of conjecture.

LYMPHOCYTOSIS has been observed in the cerebrospinal fluid in a certain number of poliomyelitis cases, but has been absent in many others. Acchiote² recently has obtained lymphocytosis of this fluid in 3 cases of acute poliomyelitis, and signs of meningeal irritation had not been present, except in 1 case where pain had been severe. Severe pain has often made the diagnosis between poliomyelitis and multiple neuritis difficult. Lymphocytosis of the cerebrospinal fluid would indicate that the pain was caused by meningeal irritation of the posterior roots. Acchiote believes this lymphocytosis is the rule in the painful form of poliomyelitis, but he offers little more than his opinion in support of this statement. Without pain, lymphocytosis may or may not be present.

Spinal Muscular Atrophy. A progressive muscular atrophy of spinal origin occurring in children is rare, and, when progressive atrophy develops, it usually belongs to the type of progressive muscular dystrophy. Batten³ has studied 8 cases of spinal atrophy in children during the last ten years. He makes three classes: in the first he places 6 of his cases, and in each of the others, 1 case. In the first, the progressive muscular weakness occurs during the first weeks or months of life, gradually progresses, and terminates in death after a variable period of weeks, months, or years. Sometimes more than one member of the family is affected. Atrophy of the cells of the anterior horns

¹ Journal of the American Medical Association, January 13, 1912, p. 109.

² Revue Neurologique, December 15, 1911, p. 711.

³ Brain, 1911, vol. xxxiii, p. 43.

is the constant pathological change found in such cases, but it may be associated with other changes in the central nervous system. It is the type known by the names of Werdnig and Hoffmann.

In the second type, the progressive muscular weakness and atrophy begin somewhat later in life, after the child has already walked, and slowly progress until death occurs from respiratory failure or pneumonia. The pathological change found in such cases is a degeneration of the lower motor and sensory neurons resembling that occurring in a toxic neuritis. The disease is slowly progressive, but there are periods of improvement. In the one case placed in this class, the disease ran its course in fourteen months.

The progressive weakness and atrophy in the third type begin in later life after the child has already walked (at the age of eleven years in Batten's case), slowly develop, and are associated with marked degeneration of the spinal cord, not limited to any one group of cells or tracts ("myelitis").

Amyotonia congenita may easily be confused with the Werdnig-Hoffmann type of atrophy, and Batten's distinction is hardly reliable in the differential diagnosis, viz., that in spinal atrophy the paralysis is more marked and the hypotonia less marked than in amyotonia congenita.

Batten's second class of cases depends chiefly on the later age of onset, periods of improvement, and more intense degeneration of the peripheral nerves than of the cells of the spinal cord. One case alone has originated this type. It is questionable whether it can be recognized as a distinct form, as in the Werdnig-Hoffmann type the fibers of the peripheral neurons may show much degeneration.

The third type is founded on the study of only one case, having the pathology of diffuse degeneration of the spinal cord, and supposed to be secondary to some vascular changes and toxic blood state. The origin and cause of this so-called myelitis and the peculiar distribution are not explained.

Amyotrophic Lateral Sclerosis. The relation of trauma to amyotrophic lateral sclerosis has long been a matter of dispute. Andrew H. Woods¹ has collected the histories of a few cases in which trauma seemed to have etiological importance, and he refers to similar cases in the literature. It is possible, as he suggests, that the trauma may be the result and not the cause of the disease, but this does not explain all the cases; and yet it has not been possible at the present time to establish the etiological relation of trauma beyond dispute.

Friedreich's Disease. The symptom-complex of Friedreich's disease may be caused by syphilis. Giannelli² reports the case of a young girl, daughter of a syphilitic mother and showing herself the signs of heredi-

¹ Journal of the American Medical Association, June 24, 1911, p. 1876.

² Monatsschrift für Psychiatrie und Neurologie, July, 1911, p. 32.

tary syphilis, who had the symptoms of Friedreich's disease beginning in early childhood. Death occurred in her twenty-second year. The pathological findings were not those of Friedreich's disease, but were those of meningo-encephalo-myelitis of syphilitic character. The case demonstrates, Giannelli thinks, that Friedreich's disease may be a symptom-complex rather than a sharply defined disorder, and may be caused by hereditary syphilis.

Epidural Ascending Spinal Paralysis. Two cases of ascending spinal paralysis caused by an epidural ascending lesion have come under my¹ observation, one reported nine years ago in association with Dr. Mills, although no mention of the type was made at that time; and one reported in my recent paper. The history of the first case was incomplete, but sufficient facts were obtained to show that external pachymeningitis had produced ascending paralysis. In the second case, a sarcoma was found, extending from the sacral to the cervical region. This tumor had caused an ascending paralysis.

Ascending spinal paralysis (Landry's palsy) is well recognized, and the epidural form is worthy of a place in neurology.

Spinal Tumor. The case of tumor of the spinal cord reported by Reichmann² is important in several respects. Motor and sensory paralysis of the lower limbs developed gradually, with extreme spasticity. Temperature and pain sensations seemed to be more affected in the left lower limb than in the right. The sensory disturbances extended as high as the umbilicus. The diagnosis of compression of the spinal cord about the ninth thoracic vertebra was made. Numerous nodules beneath the skin were found to be neurofibromas. The lesion was supposed to be a tumor, although no pain had been experienced. The level of the growth was difficult to determine as the anesthesia over the abdomen did not have a sharp limitation. The dura was exposed beneath the ninth thoracic vertebra and nothing abnormal was found, but after exposure of the cord beneath the eighth and seventh thoracic vertebra a tumor was found, and it was necessary to remove the laminae of the sixth and fifth thoracic vertebræ. Two tumors now were seen, one was 50 mm. long, and the second tumor was 10 mm. lower and globular. Both tumors compressed the cord on the right side. A spindle-shaped swelling of the cord was observed between the two tumors, and as it was supposed the cord might contain a third tumor, an incision was made in the cord posteriorly in the median line, and a tumor the size of a cherry was removed from within the cord. It is important to note that though the tumor was believed to be beneath the ninth thoracic vertebra its upper limits were beneath the fifth thoracic vertebra. The tumors were neurofibromas.

The day following the operation, the spastic paralysis became flaccid

¹ Review of Neurology and Psychiatry, September, 1911, p. 494.

² Deutsche Zeitschrift für Nervenheilkunde, vol. xlv, Nos. 1 and 2, p. 95.

and anesthesia became complete as high as the nipples. The condition began to improve after ten days, and the Brown-Séquard symptom-complex then became the reverse of what it had been previously, presumably from trauma of the side of the cord opposite the tumor. Within two months following the operation the man was able to walk with support. A year and a half after the operation his condition was very much better than it had been before the operation, although spinal symptoms were still present.

The results obtained in this case after removal of an intramedullary tumor are most important, and were possible because the tumor was well defined from the cord substance. A few cases of spinal tumor without pain are on record; the author speaks of cases reported by Schultze and Stursberg. He might have added the name of Pearce Bailey.

The cerebrospinal fluid obtained by lumbar puncture in this case before the operation was lemon yellow, coagulated almost immediately, and contained an extraordinary amount of albumin. On account of the rapidly forming coagulum, a cell count was impossible, and the coagulum was embedded in celloidin and cut. The mononuclear cells were three times as numerous as the polynuclear cells. Fluid with these characteristics Reichmann believes is found only with lesions compressing the spinal cord, and the yellow color and albumin become more pronounced as the lesion blocks the dural canal more completely. Above the occlusion the cerebrospinal fluid may be clear.

The slight or moderate pleocytosis of the cerebrospinal fluid in this case, 20 to 100 cells per cm., was caused by the tumor. It is desirable that more attention be paid to the cytological examination of the cerebrospinal fluid in tumor cases. I have known lymphocytosis to occur with brain tumor not of syphilitic character, and in such a case the lymphocytosis might cause a diagnosis of syphilis.

Division of the Anterolateral Columns in Tumor of the Cord. Pain in the lower limbs from tumor of the cauda equina may be excruciating and unrelievable by any of the means in common use. As the tumor grows, additional posterior roots are implicated and additional areas of pain are established. I have known instances in which complete transverse section of the cord had been proposed in order to cut off all painful impulses from the lower limbs. If division of the anterolateral columns alone will remove pain, it may be possible, provided the other parts of the cord be left intact, to avoid paralysis of the lower limbs and of the bladder and bowels, and yet to cut off painful impulses, by dividing the anterolateral columns. Inasmuch as the fibers of Gowers' tract would be implicated in the incision, and this tract has intimate connections with the cerebellum, ataxia would be likely to result. The operation should not be undertaken lightly and would be justifiable only when pain was very severe.

The work of Head and Holmes, of Rothmann and others, has made it probable that pain fibers are confined to the anterolateral region. In January, 1911, I¹ referred a case to Dr. Edward Martin for the operation in question. An irremovable tumor had been found in the cauda equina. At the last examination, a year and two months after the operation, the man was still in large measure relieved of pain. He was a Pole and spoke very little English, it was, therefore, difficult to judge concerning the existence of pain. Repeated observations permitted the conclusion that the operation had been of much benefit. The man never complained of pain voluntarily and his expression was peaceful, unless he was moved.

Experimental work on dogs, conducted by Cadwalader and Sweet, showed that the operation was a proper one for the object desired.

Meningitis Serosa. Certain cysts of the pia-arachnoid which have been described as meningitis serosa are considered by Bruns² as of a different type, such, for example, as those reported by Schmidt and Schlesinger. Bruns reports a case with the symptoms of spinal tumor, in which, at operation, three cysts were found, of the size of small hazelnuts. All three were ruptured in the attempt at removal. The wall of these cysts was dense and white, and was formed of connective tissue; and differed from meningitis serosa, in which merely a collection of cerebrospinal fluid is bound up in the pia-arachnoid.

Intrameningeal Spinal Hemorrhage. The occurrence of non-traumatic hemorrhage in the spinal meninges is exceedingly rare, and it seems strange that any one person should see 2 cases within one week. This, however, is the experience Wilfred Harris³ has had. His first case was in a man who, while in a stooping position, fell, and immediately experienced a sharp stabbing pain in the middle of the lumbar region. He got up at once and noticed the pain was spreading down the front of the right thigh as far as the knee, this continuing for twenty minutes. The pain then became confined to his back. He returned to his home by car and walked a few hundred yards. He went to bed at once but the pain kept him awake. As he was slightly better three weeks after his accident he returned to his work for a few days, but the pain obliged him to quit. He was never unable to stand but could not walk more than a step or two, and this was with difficulty. His legs became wasted but he had no weakness of the bladder. He lost power gradually in both lower limbs. The spine became immobile. Sensation was normal. The patellar and Achilles reflexes were absent.

The history of onset of severe sudden pain in the back and thigh, following a severe muscular effort, Harris regarded as sufficiently

¹ Journal of the American Medical Association, May 18, 1912, p. 1489.

² Neurologisches Centralblatt, September 16, 1911, p. 1026.

³ Proceedings of the Royal Society of Medicine, Neurological Section, vol. v, No. 5.

suggestive for a diagnosis of meningeal hemorrhage. The continuance of the symptoms sixteen months, with wasting of the thigh, loss of all the deep and superficial reflexes in the lower extremities, with rigidity of the back and absence of sphincter involvement, Harris believed made his diagnosis of intrameningeal lumbar hemorrhage followed by chronic meningitis absolutely certain.

The twelfth thoracic and first and second lumbar vertebræ were opened, and when the dura was cut the nerve roots were found closely pressed against and adherent to the dura on all sides, and lying in the centre of the canal, surrounded by the nerve roots appeared a purplish mass about 5 inches in length, of smooth surface and cystic in one part. The cyst burst during the operation, and about half an ounce of yellowish fluid escaped. The mass shelled out without difficulty except that a few roots were injured. After the operation the pain disappeared completely, and the man was able to lie on his back or side with comfort. He had some disturbance of sensation in the right foot. Later he was able to walk alone a few steps.

The second case was equally interesting. A man, while galloping on horseback down a hill, suddenly felt a blow on the nape of his neck as though struck by a stone, and he looked around to see if anything could have hit him. The pain became worse every minute, and he found he could not bend his head forward, but could turn it from side to side. He had intense nausea and vertigo. He got off his horse and found he could stand. He managed to reach home on horseback. After two days the pain extended down the body into the lower limbs. He could scarcely walk. After three weeks his condition had improved. The diagnosis of spontaneous intrameningeal hemorrhage was made. The ruptured vessel was believed to be in the posterior fossa or near the foramen magnum, the subsequent root pains around the trunk and in the lower limbs were attributed to irritation from the blood carried downward to the cauda equina by the cerebrospinal fluid. The blood seemed to be absorbing without causing pressure symptoms from a clot, and without producing meningitis.

This meningeal hemorrhage can be recognized by lumbar puncture, and the prognosis is good in the large majority of cases. Cerebrospinal fluid obtained by early puncture is deeply blood-stained, though it does not clot, and after four days the fluid, after centrifuging, is found stained yellow, and gives the reaction of bile pigment by Gmelin's test.

The yellow fluid obtained in the first case by lumbar puncture contained no altered blood pigment, but when tested with nitric acid for Gmelin's reaction of bile pigment, it yielded a moderately brilliant green, but not the usual full play of colors. According to Harris, Froin, in 1903, first drew attention to the alteration of the blood pigment in the cerebrospinal fluid, and it has been shown that after the fourth day of the hemorrhage bile pigment appears. Harris can offer

no explanation of the way in which the cerebrospinal fluid acts upon blood to produce bile pigment.

Chronic Hypertrophic Spinal Pachymeningitis. Mills and Williams¹ write on this interesting subject. In the case which they report the variability in symptomatology led to at least two erroneous diagnoses, at an early date that of hysteria, and later that of circumscribed serous meningitis. The patient almost a year before her death was bed-ridden for a time and apparently unable to stand or walk, but chiefly, under the influence of strong suggestion, she regained her feet and continued to stand and walk, with occasional short periods of relapse, until six weeks before her death, hence, the suggestion of hysteria. The deep reflexes in the lower extremities presented so extreme a variation that on one day foot clonus and the Babinski reflex were present and persistent, while on the next or within a day or two these phenomena could not be elicited. The sensory symptoms also showed variations. The explanation is that the widespread obliteration or partial obliteration of the vessels of the membranes and cord caused much variation in the blood supply under the influence of general vascular states; even those vessels which were patulous were thickened and inelastic and did not respond to changes in blood pressure.

The case recorded presented the usual difficulties, when symptoms indicate a lesion of a definite region of the spinal cord, as to whether operation should be performed or not. As thorough treatment had been given with mercury and iodide, and as the Wassermann and Noguchi tests were negative, cervical laminectomy was performed for the removal of a growth or of thickened membranes. At the necropsy, extensive pachymeningitis was found, with preponderance of the changes in the cervical enlargement. Much alteration of the spinal cord was found.

Osteo-arthritis of the Spine. It is well known that rigidity of the spinal column, with overgrowth of bone, may cause compression of the spinal cord, but it is seldom that such a condition resembles tumor. Bailey and Casamajor² report a series of cases of this disease. They speak of it as a condition which commonly originates without known cause, or which may be the result of gonorrhea or syphilis or other infection or trauma, whose lesions may involve a small part of a single vertebra or the whole spinal column. The process is a thinning of the vertebral disks, especially in their anterior portions, and this causes a tilting forward of the vertebræ. Some degree of this deformity is incidental to senility and may explain the stooping of old people. It is probably more frequent and comes earlier in life than is generally supposed. The vertebral bodies, deprived of their protection in the thinning of the disks, are subjected to repeated trauma, and bony overgrowth occurs,

¹ Journal of Nervous and Mental Disease, December, 1911, p. 705.

² Ibid., October, 1911, p. 588.

binding the vertebræ together. The lesions in various combinations affect one or several contiguous vertebræ, or there may be several scattered foci of disease, or the whole spine may be implicated. The changes in bones and joints affect the cord or its roots in a variety of ways. From the rarefaction of the vertebral bodies, fractures of them may occur, with injury to the cord or roots. These fractures may occur after death, as a result of handling the cadaver, or during life they may be the immediate consequence of some sudden violence, as in a case reported by Fraenkel, in which an attempt to break up adhesions at the hip caused a fracture of the second lumbar vertebra, thus compressing the cauda equina and causing paraplegia. Old fractures of the spine which did not injure the cord, may be the starting points of bony compression, coming on years later, converting the neural arches and articulations into a dense bony mass compressing the cord and possibly causing chronic inflammation of the meninges. The most common seats of compression are the intervertebral foramina.

After this lucid exposition of the disease process, Bailey and Casamajor describe in detail the cases observed by them. The first was one of paraplegia of three years' duration, with osteochondritis of the twelfth thoracic vertebra, operation, and recovery. Pain began in the lower part of the back, came in attacks, and radiated down the lower limbs. At first it was worse at night and often interfered with sleep, and was worse in damp weather. It was increased by sudden jars, walking, etc., and was always worse on the left side. At no time was there disturbance of the bowels or bladder. Erections were frequent and painful. In sitting, the man held his back stiffly, he walked with difficulty, with the body bent forward and the lower limbs flexed somewhat at the knees. Marked rigidity of the whole dorsolumbar spine was found, with tenderness to pressure over the lower part of it. There was neither paralysis nor atrophy of the lower limbs. The diagnosis from these and other symptoms of irritative compression of the spinal cord in the region of the twelfth thoracic vertebra, was made, and an extramedullary tumor was considered probable, but none was found at operation. Dr. Elsberg performed laminectomy and removed the spines and laminae of the tenth, eleventh, and twelfth thoracic, first and second lumbar vertebræ. Those of the twelfth thoracic vertebra were thickened, abnormally soft, and grayish in color. The dura was slightly congested, but the cord appeared to be normal. A report received by letter nine months after the operation stated that the man was able to ride thirty to forty miles a day on horseback and felt perfectly well.

I have given the details of this case because it is extraordinary in the localization of the lesion to one vertebra, with the production of symptoms like those of spinal tumor, and in the improvement following operation. One would fear that the long horseback rides would tend to a renewal of the vertebral disease.

Spinal Decompression. Relief of intradural spinal pressure is a subject that has attracted the attention of Bailey and Elsberg.¹ In one of their cases severe pain of three years' duration was promptly relieved by removal of the spines and laminæ of a few vertebræ, and incision of the dura. In another case there was almost complete recovery from the symptoms of a lesion at the level of the eighth thoracic segment, viz., an atypical Brown-Séquard syndrome with unilateral sensory loss and spastic motor palsy of both lower limbs. In a third case, the operation caused disappearance of a unilateral sensory and motor paralysis of one leg. In one case only temporary changes in the symptoms occurred; these were of physiological interest, but without practical benefit to the patient. In a case of infiltrating tumor of the cauda equina, the pain disappeared and the anesthesia became less; in a case of intramedullary tumor, the patient, bedridden before the operation, regained the power of walking without assistance; and, in another, the anesthesia became less.

In 5 cases in which operation was performed, there was no evidence of an increase of intradural pressure, and yet the authors conclude that even in these the improvement observed—both in symptoms of functional character such as pain, and in organic symptoms, such as paralyzes, anesthetics—leaves no room for doubt that surgical exposure of the spinal cord, even in the absence of increased intradural pressure, may effect some changes which temporarily or permanently benefit or check the symptoms of local spinal cord disease. They believe the benefit is related to the circulation in the cord or to the admission of light and air, analogous to the effect of laparotomy in tuberculous peritonitis. In most of the cases, they report the operation went no farther than an exploratory laminectomy with opening of the dura.

They believe in the results of their cases exploratory laminectomy acquires a new importance, and that as soon as this operation can be shown to be comparatively free from danger it should be recommended with much greater freedom than has been done in the past. In none of their cases was the operation purely exploratory, or undertaken with decompression as the sole end in view. Laminectomy they consider is classed as a major operation, and yet much of the gravity associated with it is due to the life-threatening conditions for which it is undertaken. Laminectomy in suitable cases and in experienced hands is neither a particularly hazardous nor trying operation.

DISEASES OF THE NERVES

Multiple Neuritis. Facial palsy occurs in healthy persons during one night, and a mononeuritis, therefore, is possible. Apoplectiform

¹ Journal of the American Medical Association, March 9, 1912.

brachial plexus paralysis from neuritis is very rare, and the reported cases have been unilateral, according to J. Hoffmann.¹ A somewhat imperfect bilateral case was reported by Krafft-Ebing, imperfect in that cranial nerves were affected. In Donath's case, three days were required for development of the symptoms. Hoffmann reports 3 cases of apoplectiform bilateral brachial palsy.

A boy, aged nine years, previously healthy, became paralyzed in both hands during one night, without subjective or objective disturbance of sensation. Later, reaction of degeneration was found with muscular atrophy. The cause was believed to be neuritis. Complete recovery occurred.

A man, aged sixty years, previously healthy, awoke one morning with paralysis and great pain of both upper limbs. The shoulder muscles were implicated. The reaction of degeneration, the tenderness of the nerve trunks, the muscular atrophy, the pain, the paresthesia, the objective disturbance of sensation gave the diagnosis of neuritis. Partial recovery occurred.

A man, aged twenty-five years, previously healthy, after night work went to sleep at seven o'clock in the morning and awoke at twelve with almost complete paralysis and severe pain of both upper limbs. Atrophy, reaction of degeneration, tenderness of the nerve trunks, pain, paresthesia, and complete recovery established the diagnosis of neuritis.

Poliomyelitis acuta was considered in the diagnosis and excluded on account of the absence of general symptoms, the symmetry of the paralysis, the pain and tenderness, the paresthesia and objective disturbance of sensation, and the complete recovery.

CUTANEOUS MULTIPLE NEURITIS. This title is striking, as little has been written concerning neuritis confined to cutaneous nerves, except the form known as meralgia paræsthetica. Schlesinger² reported 3 cases of cutaneous neuritis, eleven years ago, and he has observed only 2 more cases in the intervening eleven years. He does not include cases of cutaneous neuritis associated with disease of the central nervous system, as tabes, nor traumatic cases. Certain nerves apparently are more susceptible to infection, intoxication, or exposure to cold. In 1 case, gout, in another, syphilis were the causes. Men alone were affected in Schlesinger's cases. Symptoms of irritation may be paresthesia or severe pain, or hyperesthesia confined to the distribution of a cutaneous nerve; later, there may be impairment of sensation. Movement of the affected part may increase the pain. Schlesinger has observed vasomotor symptoms in 1 case. The course varies, it may be weeks, months, or years. The radial distribution of the dorsum of the hand is especially likely to be affected.

¹ Münchener med. Wochenschrift, February 27, 1912, p. 458.

² Neurologisches Centralblatt, November 1, 1911, p. 1218.

Sciatica. Dejerine,¹ for a number of years, has been describing *radicular sciatica*, *i. e.*, sciatica in which the roots of the nerve are affected; and, in association with Michel, he has recently reported another case, probably of syphilitic origin. The antero-external muscles of the leg were paralyzed except the anterior tibial muscle, and root anesthesia was present, *i. e.*, there was anesthesia to touch and pain in the dorsal part of the big toe and extending over the dorsum of the foot and the anterior part of the lower leg in the distribution of the first sacral root. Dejerine has frequently noticed sensory disturbance of root type in sciatica, and he considers radicular sciatica as much more common than truncal sciatica, and the former is usually syphilitic. The lesion is intradural, as shown by the lymphocytosis of the cerebrospinal fluid obtained by lumbar puncture.

Thomas shares Dejerine's opinion and believes also that motor disturbance is not infrequent in sciatica, and is not confined to the sciatic distribution. When the muscles of the leg and posterior part of the thigh are paretic and atrophied, the quadriceps femoris innervated by the anterior crural nerve, and the adductors of the thigh innervated by the obturator nerve are likewise affected. These three nerves have one root in common, the fourth lumbar, but also the roots of these three nerves are near together, and may be easily affected together by a syphilitic process. In some cases of sciatica, the patellar reflex is diminished and the pain is localized in the territory of the anterior crural nerve as well as in that of the sciatic. The escape of the anterior tibial muscle, when the other muscles of the peroneal nerve supply are paretic, indicates root implication, as the root supply of this muscle is distinct from that of the remaining muscles of this group.

TREATMENT OF SCIATICA. The treatment of sciatica by injection of *ice-cold physiological salt solution* into the sciatic nerve is considered by Ossipow.² Pain is very severe when the needle penetrates the nerve and when the fluid is being injected, but soon disappears, although it may return a few hours later. The cases that Ossipow studied were of long duration and severe, and yet his results were excellent, as improvement occurred in 4 cases and cure in 6. Various other methods of treatment were tried in most of the cases before the injections were employed. Inasmuch as he obtained good results from amounts not over 60 c.c. and occasionally caused chill and fever after injecting 20 c.c., he does not think injections of large amounts advisable. In some cases, ten to fifteen injections were necessary. After the pain diminished in the thigh, severe burning pain frequently was felt in the calf, and this was lessened by massage and warm com-

¹ Revue Neurologique, February 29, 1912, p. 288.

² Monatsschrift für Psychiatrie und Neurologie, July, 1911, p. 54.

presses over the calf. One to three injections merely give relief in the chronic cases, and do not cure.

Recurrent Oculomotor Palsy. Much has been written regarding this strange affection, and the manner in which the palsy has been produced has not been understood. The cases with necropsy have been rare. In some instances, other nerves than the oculomotor have been implicated. Some have regarded the condition as purely functional; others have sought an organic cause. A case of this disorder with necropsy is reported by Shionoya.¹ The right oculomotor nerve became paralyzed repeatedly, and it was found enveloped at the base of the brain by a fibropurulent mass. The nerve for half a centimeter was five times as thick as the corresponding part of the left oculomotor nerve. The recurrent oculomotor palsy in this case, therefore, was caused by fibrous thickening about the nerve. It was supposed by Shionoya that the spindle-shaped fibroma of the nerve by its slow growth exerted a constant irritation upon the neighboring sensory nerves, and a migraine attack resulted through summation of pain. A similar condition is seen in the symptomatic epilepsy of brain tumor. It was supposed also, as the palsy of the oculomotor nerve in the early attacks usually began a few days after the onset of the headache, that the fibrous tumor enlarged because of sensory and vasomotor reflexes or became edematous. The oculomotor nerve, after its exit from the brain, passes between the posterior cerebral and superior cerebellar arteries, and on this account is believed by Shionoya to be more liable to form lesions. Bornstein has expressed the opinion that the point of exit of the nerve through the dura is a *locus minoris resistentiæ*.

Tic Douloureux. Patrick² has had a very extensive experience in the treatment of tic douloureux with alcoholic injections, and his conclusions are:

1. For the very old, the very feeble, and for those with grave organic disease, the injections are incomparably the best treatment. Practically without danger, without shock, without an anesthetic, almost without inconvenience the great majority of such patients may be kept comfortable until length of years or intercurrent disease brings the end.

2. Save in the hands of a few exceptionally experienced and skilful men, the Gasserian ganglion removal is a dangerous and somewhat uncertain procedure; certainly a capital operation.

3. When the sufferer from tic douloureux is young and vigorous with a prospect of living many years, it would be better for him to have the radical operation done at once by an experienced surgeon, as in all probability eventually he will come to it.

4. Injections of alcohol make subsequent more radical operation no more difficult or dangerous.

¹ Deutsche Zeitschrift für Nervenheilkunde, vol. xlii, Nos. 1 and 2, p. 155.

² Journal of the American Medical Association, January 20, 1912, p. 155.

5. When the patient is exhausted by long-continued pain and loss of sleep and is weak from lack of food, the temporary relief afforded by alcohol injections enables him to recuperate and get into condition for operation.

6. Many conditions are mistaken for tic douloureux, and the alcohol injections employed for these discredit the treatment when employed for tic douloureux.

Neuralgia Treated by Alcoholic Injections. As alcoholic injections or the treatment of tic douloureux have been very successful, the attempt to treat certain other similar conditions in the same way has been made. Pussep¹ has found these injections useful in intercostal neuralgia and pain of root origin. In rigidity of the spinal column with pain (v. Bechterew type of spinal rigidity) injection of alcohol in the intervertebral foramina, *i. e.*, at the exit of the nerve roots has caused girdle pain to disappear and some movement of the back has been recovered. Pussep obtained satisfactory results by this treatment in several cases of intercostal neuralgia. Slight paresis appeared but was of short duration, while diminution of sensation persisted. The injection should be made about the width of a finger from the transverse process of the vertebra selected, the needle should be long and held perpendicularly to the back, and the injection should consist of 0.25 to 1 gram of a 1 per cent. solution of stovain in 90 per cent. alcohol. When the injections are made in several places each injection must be less in amount than when only a few injections are made.

In 4 cases of intercostal neuralgia the pain disappeared after the first injection, and had not recurred during the six and a half months following while the patients were under observation. In 2 cases, the pain disappeared after the third injection. The intercostal nerves are motor and sensory, but the loss of motion produced by alcoholic injections in one or two nerves is not very important and is transitory. In v. Bechterew's type of rigidity of the spinal column, Pussep recommends ten injections at one time.

Phrenic Pain. The importance of the sensory fibers of the phrenic nerve in clinical medicine has not been properly appreciated. As Leonard J. Kidd² points out, only a few modern text-books of anatomy, physiology, medicine, or neurology make any important reference to the existence of a sensory portion of this nerve, and yet he has collected a number of references to papers in the literature in which the sensory portion is considered. Large numbers of cases of referred phrenic pains have been misunderstood by clinicians. Kidd says that in thirty years he has never seen any clinician examine a case of pain in the neck, shoulder, or upper arm from the standpoint of the sensory phrenic. Phrenic pains may occur in the subjects of old pleuropneumonia under

¹ Archiv für Psychiatrie, vol. xlviii, Part 2, p. 691.

² Review of Neurology and Psychiatry, November, 1911, p. 587.

the influence of psychical or physical stress or trauma, exposure to cold, or anything that impairs the general health, many years after the initial lesion of the sensory phrenic. In all such cases we ought to use local applications over the situation of the third to the sixth cervical root ganglia, and over the inflamed or affected viscus.

A tumor of the right suprarenal gland may cause pain over the liver and right shoulder tip, and operation for removal of the tumor may be successful. Kidd has seen an association of shoulder arthritis and sensory phrenic organ involvement, chiefly of the afferent diaphragmatic neurons. He believes that in a patient who has basal pleuritic adhesions, even of ancient date, the constant stream of excessive impulses passing up the branches of the sensory phrenic, especially at times of mental or physical strain, often predisposes toward the determination of a shoulder arthritis. The sensory phrenic, therefore, should be considered in every case of shoulder arthritis. Sensory phrenic involvement may be the cause of hiccup, it may also cause a diaphragmatic tic, and the lesion may be basal pleuritic adhesions, or thoracic aneurysm.

Facial Palsy and Electrical Reactions. The condition of electrical reaction in peripheral nerve palsy is not always indicative of the condition of voluntary power in the distribution of the affected nerve. Function may return entirely before the normal electrical response is obtained, and, on the other hand, the electrical reaction may become normal while voluntary power remains slight. The explanation for the latter condition, which Cohn and Gatz-Emanuel¹ accept, is that the loss of the sensation of movement accompanying a paralysis interferes with the idea of movement, especially when the paralysis occurs in a very young person; much as the loss of speech in early childhood follows acquired deafness. This form of paralysis should be distinguished, according to these authors, from that resulting from pain, when a part is kept immovable because of the pain produced by motion and the knowledge or idea of movement is forgotten. The two forms of paralysis, however, are related.

These authors report a case of what they regard as undoubtedly peripheral facial palsy, without any return of function, in which the electrical reaction for three years had been that of a disappearing palsy, viz., return of faradic irritability and quick contraction to the galvanic current in certain muscles. The electrical reaction, therefore, in rare cases may be misleading as regards prognosis.

It has been held by Neumann that only neurotic persons are liable to facial palsy, and that exposure to cold acts only as a provoking agent. This view Bernhardt was unable to confirm. Auerbach² has observed facial palsy in three successive generations in one family.

¹ *Neurologisches Centralblatt*, February 1, 1912, p. 147.

² *Ibid.*, February 15, 1912, p. 217.

A man, aged sixty-two years, had a facial palsy of mild type, his daughter had facial palsy at the age of thirty years, and his granddaughter had it at the age of twenty-five years. Auerbach believes that if attention were paid to heredity when facial palsy develops in an intelligent person, a family tendency would be determined more frequently. When the patient is ignorant, little reliance can be placed upon his statements as to family disease.

FACIAL PALSY IN LEUKEMIA. Facial palsy occurs occasionally in leukemia and may be bilateral, as in a case reported by Laroche and Chatelin,¹ in which both sides of the face became paralyzed within forty-eight hours. A necropsy was not obtained, and, therefore, leukemia could not be demonstrated as the cause. Eichhorst has observed hemorrhage within the nerves as a cause of paralysis and such hemorrhages within the central nervous system are recognized in leukemia. May has found leukemic infiltration of the facial nerve.

Senile Retrobulbar Optic Neuritis is a condition little known. Higier² has observed this form of neuritis in men between the ages of sixty-five and seventy years who had a moderate degree of arteriosclerosis. There had been no intoxication or infection, no glycosuria or albuminuria. In one case, slight nicotinism existed, and in another, possibly a mild fish poisoning. The commencement was never sudden, but was with headache, especially in the temporal region and pain in the orbit by pressure on the eyeball. The vision failed completely within twelve to twenty-four hours, and light reaction was lost. Nothing abnormal was seen at first in the eye ground, but gradually optic atrophy developed and was more intense on the temporal side of the disk. Central scotoma was present in the early stages, but not in all the cases. No other symptoms of nervous disease developed.

Brachial Plexus Palsy from tearing out of the roots of the plexus from the spinal cord must be of rare occurrence, and, therefore, the case C. K. Mills³ reports is interesting. His patient was walking on the street when he was struck on the head, shoulder, and back by a man who fell from the third story of a building. He was taken to a hospital and remained there nearly twelve weeks. From the time of the injury the man was completely paralyzed in the left upper limb and he had great pain in this member. The left pupil did not respond promptly to light and mydriatics, and the left palpebral fissure was smaller than the right. This condition was attributed to implication of the left sympathetic fibers. The left upper limb was flaccid and presented marked alteration of sensation. The roots of the plexus were thought to be torn from the cord, and operation was advised in the hope of relieving the pain. Pressure or interference with the

¹ *Revue Neurologique*, November 30, 1911, p. 642.

² *Neurologisches Centralblatt*, February 1, 1912, p. 155.

³ *Pennsylvania Medical Journal*, August, 1911.

pyramidal tract of the left side was indicated by patellar clonus, ankle clonus, doubtful Babinski sign, and early impairment of power in the left lower limb. It seemed probable that some hemorrhage had occurred into the cord or its membranes. Dr. Frazier operated and it was found that the fifth, sixth, seventh, and eighth cervical anterior and posterior roots were absent, and probably had been evulsed at the time of the accident. The fourth cervical and first thoracic posterior roots were divided. The pain to some extent was relieved but never disappeared, the paralysis was not affected by the operation.

It is remarkable in this case that the patient complained of extreme pain in parts supplied by nerves whose roots had been completely torn away or severed. Mills thinks this pain may have been due, in part at least, to the irritation remaining in the spinal portion of the nervous arc; in part to the same principles as are used to account for pains and other phenomena referred to the amputated portions of a limb.

Birth Palsy from Root Lesions. Birth palsy of a limb has not been exhaustively studied from the pathological aspect. As George F. Boyer¹ remarks, with the exception of papers describing the ordinary type of brachial plexus root lesions, the literature relating to the pathological changes found in obstetrical paralysis is very scanty. Numerous cases have been reported from the clinical and surgical aspects, with occasionally a short outline of the pathological condition present, which is usually in the fifth cervical root near its junction with the sixth. More roots than the fifth are often involved. Occasional mention is made of injury to the cord, but with no great detail.

In the case Boyer reports, the right seventh cervical root was the site of greatest trauma. The right upper limb was paralyzed from birth. The usual site of the lesion is in the nerve trunk itself, but in his case a grave injury of the cord was superadded, amounting to a Gudden's evulsion at the level of the seventh cervical root, and diminishing in severity above and below this point.

Although the left upper limb was not involved at birth, and the patient had fair use of this limb, histological examination showed that there was great cell destruction on the left side in the cord, especially at the seventh cervical level.

The sensory system, in Boyer's case, suffered least damage. The local fibrosis is explained by the invasion of organized fibrous tissue, resulting from the trauma, into the injured areas of the cord. The almost complete absence of glia cells locally is difficult to explain.

Regeneration of Nerves. It is important to know how long after an injury of a nerve regeneration may be expected. Basil Kilvington²

¹ Proceedings of the Royal Society of Medicine, Neurological Section, November 23, 1911, p. 31.

² British Medical Journal, January 27, 1912, p. 177.

concludes from his experiments that the condition found after the non-union of a cut nerve trunk is very variable. These varying conditions render any definite statement as to time limit to secondary suture difficult, if not impossible. Kilvington has had successful cases of secondary nerve suture in the human subject after many years of non-union, even after six years. Where regeneration after secondary nerve suture has not taken place, the main cause (apart from local conditions at the suture area, such as sepsis) is lack of regenerating power in the nerve cell.

MISCELLANEOUS NERVOUS DISEASES

Muscular Dystrophy. Babinski and Jarkowski¹ refer to the fact that in muscular dystrophy the patellar reflex may disappear before the quadriceps muscle is distinctly atrophied or the volitional contractility much diminished. The explanation for this is not easily found.

They report a case of this disease in which the idio-muscular contraction (the contraction of the muscle substance as produced by tapping the muscle) was lost. This abolition of muscle irritability is, according to these authors, a cardinal symptom of muscular dystrophy, and distinguishes this disease from the amyotrophy of neuritis and poliomyelitis, as in these latter diseases the idio-muscular irritability is preserved or even exaggerated. The authors do not state whether or not this irritability is preserved in these diseases when the tendon reflexes are lost.

A relation exists between the idio-muscular contraction and the tendon reflex in muscular dystrophy, as the two are affected in the same muscle groups. These two phenomena probably have the same origin, and the loss of the tendon reflex in muscular dystrophy probably depends upon alteration of the muscle fibers. The loss of these two forms of contraction may be found in muscles that not only have preserved their volitional power, but also their electrical excitability.

Muscular Hypertrophy with Weakness. It seems surprising at times to find a person of exceptional muscular development with weakness, as in a case reported by Andrew H. Woods.² As he says, overtrained athletes and overworked laborers with physiologically hypertrophied muscles may show distinct loss of power. The weakness then is temporary and strength is restored by proper rest. Where the loss of power is permanent the condition may be regarded as pseudomuscular hypertrophy, but histological examination of excised muscle does not show degeneration and fatty and fibrous overgrowth.

¹ *Revue Neurologique*, June 30, 1911, p. 778.

² *Journal of Nervous and Mental Disease*, September, 1911, p. 532.

Woods has unearthed some interesting examples in literature of the condition he describes. The first case of his series bears the date of 1875. The case he himself reports was in a negro, whose symptoms began after the age of forty, and there was no history of muscular disease in the family. There was no atrophy from examination of the patient or of a piece of excised muscle. The tendon reflexes, in even the muscles most involved, were not sub-normal but were rather increased, as were galvanic and faradic excitability. There was not the soft flabby feeling to the man's muscles which characterizes muscular dystrophy. The man had painful cramps, dribbling of urine, dull pain when the muscles had been rested, and abnormal mechanical and electrical excitability. The affected muscles, when contracted, felt as firm as those of an athlete. The tonic contraction at the beginning of voluntary motion, characteristic of Thomsen's disease, was not observed, nor was the contraction of the muscles as hard as in this disease.

The characteristics of this peculiar muscular disorder as given by Woods are: Increased bulk of affected muscles, which feel firm when contracted; diminished power with early fatigue; hypertrophy of individual fibers, some increase in number of nuclei; no proliferation of fibrous or fatty tissue, and no degeneration; tendon reflexes, mechanical irritability and electrical reactions may vary from slight diminution to slight increase; no qualitative electrical changes; a few cases show vasomotor skin changes; and some, dull pain or tenderness of muscles; the course is slow, but little change occurring from year to year; males are more often affected; the upper extremities may be involved more than the lower, though any part of the body may be affected.

Myotonia Atrophica. Symptoms of myotonia have been reported in a number of diseases, as syringomyelia, epilepsy, polyneuritis, tabes, multiple sclerosis, myelitis, and paralysis agitans; but their occurrence with muscular dystrophy is worthy of special note. A very interesting study of this form, known as myotonia atrophica, has been made by Ascenzi.¹ In his case two groups of symptoms were present, those caused by the myotonia and those caused by the muscular atrophy. As a child, the patient fell from slight cause, in walking, eating, or in performing any other movement he experienced great heaviness, as though the limbs were bound down and had become stiff, and this heaviness was overcome by repetition of the same movement. These symptoms were congenital or dated from early childhood, and with others were indicative of myotonia. The symptoms of muscular dystrophy were wasting of the posterior part of the neck and supraspinous fossa, underdevelopment of the deltoid muscle and of the upper and lower arm, winged scapula, sacrolumbar lordosis, protruding abdomen, and myopathic facies.

¹ Monatschrift für Psychiatrie und Neurologie, March, 1912, p. 201.

There is a difference of opinion regarding the significance of the association of these two groups of symptoms. Ascenzi believes that myotonia atrophica forms a distinct type, because the frequency of these cases is noteworthy, the clinical type is usually the same, similar muscular changes are found in each condition, each attacks males more frequently than females, in both symmetrical muscles are affected, and the proximal more so than the distal muscles. In other diseases in which myotonic symptoms occur, the latter do not cause a distinct type, and they are believed by most persons to be merely associated with the symptoms of the disease in which they occur.

Thomsen's Disease. Certain symptoms resembling those of Thomsen's disease may be acquired, and the disorder so produced may be difficult to classify. Bittorf has attempted this difficult task. He includes the myokymia of Schultze and the myotonia acquisita of Talmas under his designation of peripheral spasms. He describes the clinical picture as follows: Fascicular tremors, in the mildest cases, follow mechanical or faradic irritation of the muscles of the lower limbs, especially of the gastrocnemius. When the case is severe, irritation of the character mentioned is followed by tetanic contraction of the muscles, lasting one-half to one minute, and disappearing with fibrillary or fasciculatory tremor. The tonic contraction occurs after direct as well as indirect faradic irritation, also after direct galvanic irritation. Powerful voluntary movement causes long-persisting painful spasms, which disappear with fascicular tremor. In pronounced cases, these tremors occur without previous irritation. Mild symptoms of neuritis may be detected (diminution of tendon reflexes, sensory disturbances, partial reaction of degeneration). The localization, in almost all cases, is confined to the calf muscles, or at least the muscles of the lower limbs. Taking cold, trauma, and overwork are supposed to be causes. The course is benign in the milder cases and complete recovery occurs, but at present the course of the more severe cases is uncertain.

Grund¹ discusses this symptom-complex and concludes that the tremor, the spasms, and the limitation to the lower limbs are unlike the symptoms of Thomsen's disease, and he reports a case bearing on the subject under discussion.

The persistence of the contracture in his case was like that of myotonia, as was the manner of opening the hand after making a fist, but a difference was found in the long duration of the contraction and its more spasmodic character. The muscles were hard as a board, and the contraction relaxed rather suddenly. Pain was frequent in the calf muscles; this is not usual in myotonia. The case belongs to the type described by Bittorf as peripheral spasms, and shows that some relation exists between myotonia and the acquired spasms, but exactly what this relation is has not been determined.

¹ Deutsche Zeitschrift für Nervenheilkunde, vol. xlii, Nos. 1 and 2, p. 110.

Hereditary Muscular Atrophy with Cataract. In a very interesting paper A. S. Hamilton¹ discusses the occurrence of muscular atrophy and cataract in different members of the same family. He observed a case in which these two forms of degeneration existed, and investigation showed that other members of this family were similarly affected. The form of atrophy seemed to correspond more to that designated by the names of Charcot, Marie, and Tooth. An extensive search of the literature to find other cases of the same sort met with only partial success. Cases are known in which epilepsy and tetany were associated with cataract. There is much difference of opinion regarding the frequency with which different neurological conditions have accompanied cataract, especially hereditary cataract. Consanguinity has been regarded as a cause of hereditary cataract and other family diseases. Myotonia atrophica and cataract also have been found in the same family.

Arthritic Muscular Atrophy. It is well known that muscular atrophy is liable to develop in a limb soon after the onset of severe disease of one of the articulations of the limb, and to be more intense in the extensors above the affected joint. The experiments of Raymond have been used many years in explanation. This investigator found that dogs, in which he produced joint disease artificially, were much more liable to have the atrophy if the posterior roots corresponding to the limb operated upon were not cut, and from this he argued that irritation of nerve fibers in the affected joint influenced detrimentally the cells of the anterior horns in the spinal cord.

Charles Lewis Allen² has repeated Raymond's experiments, but has been unable to confirm the results of this investigator. Allen concludes that the atrophy following joint disease or injury probably is due to the combination of several causes. The inactivity of the limb with the resulting disuse of the muscles and the cutting off thereby of necessary stimuli to the nerve centres, may be causes. Immobilization alone was found to cause wasting in a rabbit's leg which was put in a position of extension in a light plaster cast without pressure for a period of nineteen days. The difference in size persisted for some time after the animal was allowed to use again the leg which had been immobilized. Where there is joint effusion, overstretching of the muscles and constant pressure may play a role, as may also impairment of general nutrition. Some toxic substance possibly may be produced in the inflamed joint, but it is not easy to understand how it affects a definite group of muscles. Allen could find but little evidence of direct extension of the inflammation from the joint, and yet, in some pieces of muscle from near the joint, round-cell infiltration was present when periarthrititis accompanied the arthritis.

¹ Review of Neurology and Psychiatry, December, 1911, p. 645.

² Journal of the American Medical Association, December 23, 1911, p. 2053.

He mentions as a suggestive fact that the nerves which supply the joints are branches of the same trunks from which the affected muscles draw their supply, or have their origin in the same region of the spinal cord. The careful study made by Allen is valuable, more in clearing the field for further investigation than in the positive results obtained, and teaches that we must be cautious in accepting Raymond's explanation of arthritic muscular atrophy.

Dermatomyositis. Dermatomyositis, as Frederick E. Batten¹ says in an important recent paper, is a rare condition and especially so during child life. He has been unable to find the record of any case of this disease in a child with full pathological examination. Schüller, however, described a case of polymyositis in a boy, aged seven years, which followed whooping cough. The disease reached its height in three weeks, and in eight weeks the boy was well. Schüller collected 5 other reported cases of myositis in children, but none of these cases was fatal. As this condition is rare, it may be well to give Batten's summary of the findings and symptoms. There is a cell infiltration of the interstitial muscular tissue with degeneration of the muscle fibers. The muscle fibers are in part destroyed by edema, in part by a leukocytic infiltration which is most marked in the region of the vessels.

The symptoms are swelling of the extremities from inflammatory edema of the subcutaneous tissue and muscles, acute pain, muscular rigidity, great tenderness on pressure, and an erythematous rash resembling erysipelas over the affected muscle. The character of the rash may vary to a very great extent; it has been described as resembling urticaria, erythema nodosum, or purpura. The onset of the disease is gradual, there is a moderate rise of temperature and rigors are absent. When the acute stage is passed, the skin is left in an indurated and inelastic condition, and the muscles are hard and contracted.

Batten gives the clinical and pathological findings in a typical case of polymyositis occurring in a child, aged nine and one-half years, in which the diagnosis was made from the character of the affection of the skin, the concomitant affection of the subjacent muscles, the periodic attacks of acute swelling of muscles and redness of the skin, the subsequent induration of the skin and muscles after the subsidence of the acute attacks, the absence of any evidence of affection of the joints, of the blood, of the viscera, or of the nervous system, and the absence of any sign of syphilis, tuberculosis, *Trichinella spiralis*, or of any form of organism capable of being cultivated on the ordinary media. The pathological changes found were limited to the skin, subcutaneous tissues, and muscles. The most striking point with regard to the changes in the muscles was that the superficial portion of the muscles was

¹ Proceedings of the Royal Society of Medicine, Neurological Section, February, 1912, p. 103.

affected while the deeper portion escaped. The perivascular infiltration of the vessels of the muscles with small round cells was a striking feature, as was the thickening of the walls of the vessels and in some parts obliteration of the vessels. Infiltration of the muscle fibers with lymphocytes occurred with the formation of "lymphorrhages," usually near the vessels, although not invariably so. The cause was supposed to be some toxin of exogenous origin, and Batten suggests that it may have been of a character that it could only be determined by animal inoculation. As the child he observed lived in close proximity to horses, the infection may have been conveyed from these animals. Bacteriological examination of the blood, fluid obtained from muscle puncture and cerebrospinal fluid had a negative result.

Amyotonia Congenita. This symptom-complex first recognized by Oppenheim is one of flaccid paralysis of the lower limbs especially, but in some cases of all the limbs, is probably congenital in origin, with diminished or abolished tendon reflexes, and without disturbance of sensation. A case with necropsy has recently been reported by Griffith and Spiller.¹ The child, aged fifteen months, had general flaccid paralysis from birth, and had never been able to use his legs or handle objects. He was unable to sit or hold his head erect, and had only slight movement of arms and legs. The limbs were not wasted, the patellar reflexes were absent, and faradic and galvanic responses were not obtained. The child improved for a time under treatment, but death occurred later.

Few nerve cells were found in the anterior horns of the lower cervical and lumbar regions, the anterior roots of these regions were degenerated, and the muscles examined showed great degeneration.

It is interesting to compare the report of this case with the one reported by Spiller in 1905, in which changes in the spinal cord were not found, and the alteration of the muscles was far less intense. The cases with necropsy are not numerous, and yet they are sufficient to show that the position of amyotonia congenita is not well defined. It is uncertain whether it is a distinct entity, whether it belongs to progressive muscular dystrophy, whether it is the same disease as the Werdnig-Hoffmann muscular atrophy, or whether it is an intra-uterine poliomyelitis. From the review of the few cases reported with necropsy, we may conclude that, in the lighter cases, the alteration may be confined to the muscles, and possibly, therefore, the disease is primarily muscular, but this inference is not fully warranted. In the intense cases, the nervous system is affected in marked degree.

The resemblance of amyotonia congenita to the Werdnig-Hoffmann type was recognized by Rothmann, but is disputed by Marburg,² and the latter arranges in parallel contrasting columns the important

¹ American Journal of the Medical Sciences, August, 1911, p. 165.

² Obersteiner's Arbeiten, vol. xix.

symptoms of each. The differences, even as shown in this way, are not very great. In a case with necropsy studied by Marburg, alteration of the cells of the anterior horns, of the peripheral nerves, and of the muscles was found. Marburg comes to the remarkable conclusion that amyotonia congenita probably is acute poliomyelitis of the fetus.

Occupation Neuroses. Paul¹ considers the peripheral pathology of the occupation neuroses, attempts to show that they are caused by trauma of the peripheral nerve structures, and rejects the widely accepted central pathology. He believes that occupation neurosis and occupation neuritis so-called are essentially the same in origin, and are the results of different degrees of trauma experienced at different parts. He gives the results of a study of 10 cases in which he tested the patient's ability to do other than the occupational acts fully and perfectly. Every case gave evidence of other acts being interfered with to a marked degree, corroborating Ross' opinion that when writer's cramp is present all actions requiring delicate manipulations are also impaired. In an examination of 200 cases of occupation neurosis made by Paul, pain was present in 177. In many cases this symptom was annoying, frequently preventing sleep, and sometimes the pain came on only after ceasing work. The frequency of pain in the muscular regions suggested that some lesion had occurred in the muscles or overlying fasciæ, or both. Tenderness existed in 10 cases. In only 4 cases did the symptoms point to involvement of nerve trunks. The principal result of an analysis of these 200 cases is that muscles, joints, and regions near joints are preponderantly the parts in which sensory symptoms occur, rather than the course and distribution of definite peripheral nerves. Paul thinks the impacts, compressions, squeezings, tensions, and stresses of excessive physiological functioning, acting on muscle tissue, or on sensory and motor nerve structures which run in the soft tissues and terminate in muscle, tendon, joints, or fasciæ, bring about neurolytic or myolytic changes responsible for the occupation neuroses and so-called occupation neuritis and occupation pain.

Vibratory Sensation. Williamson² has made a study of the vibratory sensation. He has found a tuning fork, $7\frac{1}{2}$ inches long, marked 440, A1, useful. A metal foot-piece is desirable, or a coin may be placed between the foot of the tuning fork and the part tested. The tuning fork must be placed over a part of the body where bone is near the surface. He has found the vibratory sensation a very delicate test for detecting slight affection of the sensory part of the nervous system. This sensation may be lost, though the sensations of touch, pain, and temperature are well preserved. It should be tested before concluding that a lesion is confined to the motor parts of the nervous system. In some diseases in which anesthesia appears late, the vibratory

¹ Journal of Nervous and Mental Disease, August, 1911, p. 449.

² Review of Neurology and Psychiatry, August, 1911, p. 419.

sensation may be the first form of sensation affected, or where there has been recovery from anesthesia the vibratory sensation may remain absent when other forms of sensation are normal. The loss of this sensation is of special value when the symptoms of nervous disease are slight, as in early neuritis and incipient tabes, and one may be enabled thereby to distinguish between incomplete neuritis and anterior poliomyelitis. The differential diagnosis between these two affections is very difficult at times. The sign is valuable in diagnosing between poliomyelitis and myelitis, as a loss does not occur in the former. In hemianesthesia, if the vibratory feeling is lost when the foot of the tuning fork is placed on the lateral edge of the sternum on the side of the tactile anesthesia, but felt when placed on the other lateral edge of the sternum, in Williamson's opinion, the case is probably one of hysterical or functional anesthesia or malingering. This statement, in my opinion, requires verification. In hemianesthesia of spinal origin we should expect the vibratory feeling to be preserved on the side of the anesthesia, as the fibers conveying this sensation ascend in the posterior columns without decussation, but in cerebral hemianesthesia the loss of vibratory sensation would be observed where loss of sense of position occurs, and on the side of the hemianesthesia.

Dentition and Internal Secretions. That delayed dentition may result from defective internal secretion of the body is an idea advanced by Josefson.¹ He has hastened the development of the teeth by the administration of thyroid tablets. The defective internal secretion may affect the development of the teeth in the intra-uterine period, and the defect in the glands may be in the mother or in the fetus. Where a woman has had children with defective teeth it would be advisable to give her thyroid tablets during a new pregnancy, as in this way it may be possible to influence the growth of the fetus. Sometimes, where hypothyroidismus exists, abortive cases of the same condition may be found in the parents. Disturbance of dentition is common in myxedema. The sexual glands probably have some influence on dentition, although this subject has not been sufficiently studied. The organs of internal secretion form a closely associated system, and it is not so important to determine which organ has the most influence.

Myasthenia Gravis. It seems that several types of this remarkable disease must be recognized. Oppenheim called attention to the associated congenital deformities or sexual infantilism seen in certain cases. In some cases, infection or intoxication plays a role in etiology, in others, tumors have been found in various parts of the body, as in the kidney, thymus, lungs, ribs, etc. It is uncertain in what way these tumors are related to myasthenia. The disease has been observed in association with Graves' disease, in some instances the symptoms of

¹ *Neurologisches Centralblatt*, August 1, 1911, p. 834.

the latter appear after myasthenia has existed some time, in others, it is impossible to say which morbid process developed first. Myasthenia, on the other hand, may develop in the course of Graves' disease, or there may be ocular symptoms in Graves' disease which are uncommon in this affection.

Chvosték has regarded myasthenia and tetany as related diseases, in that the former is indicative of glandular hyperfunction, the latter of hypofunction. Ernst Tobias¹ discusses myasthenia in its various aspects and reports a case of Graves' disease in which myasthenia developed.

In a recent case of myasthenia gravis studied by H. Curschmann,² congenital defects of development were present, such as Oppenheim has believed are common in this disease. Aplasia of the genitalia and hyperplasia of the lungs were findings of importance. The central and peripheral nervous systems were normal, but collections of lymphocytes were seen within the muscles, as described by several investigators. They were not metastatic growths from the thymus gland, and could not be regarded as having an etiological relation to myasthenia.

Curschmann's case was remarkable in that it had the longest course (nineteen years) on record, the symptoms have been present in one case fifteen years and in another eighteen years.

Graves' Disease. OCULAR PALSIES are not common in Graves' disease. In the case reported by Bernhardt,³ partial external ophthalmoplegia was present in both eyes. The left eye became affected first. It seems probable that these paralyses are caused by toxic products from the faulty metabolism occurring in Graves' disease.

UNILATERAL EXOPHTHALMOS is a rare sign of Graves' disease. Koenig⁴ has recently presented before the Neurological Society of Paris a woman, aged thirty years, who had tremor, tachycardia, some enlargement of the thyroid gland, flushes of heat, and unilateral exophthalmos with Stelwag's and v. Graefe's signs on the same side. The other eye was normal. In most of the reported cases of this kind, the hypertrophy of the thyroid gland has been greater on the side of the exophthalmos.

Hereditary Tremor. Tremor manifested through more than one generation of the same family is a rare form of hereditary disease. Kreiss⁵ has studied several families in which it occurred. In one it was present in three generations and assumed the character of intention tremor. It appeared in each generation at an earlier age than in the preceding generation. The grandfather developed the tremor

¹ Neurologisches Centralblatt, May 1, 1912, p. 551.

² Zeitschrift f. d. g. Neurologie und Psychiatrie, 1911, vol. vii, No. 3, p. 318.

³ Neurologisches Centralblatt, July 1, 1911, p. 706.

⁴ Revue Neurologique, December 15, 1911, p. 703.

⁵ Deutsche Zeitschrift für Nervenheilkunde, vol. xlv, Nos. 1 and 2, p. 111.

between the fiftieth and sixtieth years of life, a son developed it in his twenty-fourth year, the grandchildren were affected between the sixth and tenth years, and showed also abnormalities of development.

In the second family, 7 in three generations had tremor. The youngest generation was affected between the fourth and twenty-third years, whereas the previous generation was affected between the twenty-fifth and thirty-second years.

In the third family, the tremor varied in intensity, was greater under observation and on voluntary movement.

Heredity establishes the nature of the tremor, and yet it has been regarded mistakenly as a sign of multiple sclerosis, especially as nystagmus may occur in both conditions, but many signs are found in multiple sclerosis that are wanting in hereditary tremor. Senile tremor and toxic tremor can be distinguished by the history. The tremor of paralysis agitans, neurasthenia, and hysteria is recognized by other symptoms present and peculiarities in the character of the tremor.

Chorea with Signs of Lesion of the Pyramidal System. The belief is entertained by some neurologists that Sydenham's chorea has an organic basis, and Lian and Landesmann,¹ in support of this view, report a case in which they found signs of a lesion of the left pyramidal tract. These are recently discovered signs and possibly their actual value has not been determined. Their patient, a child, when told to keep the left lower limb elevated could do so until the right lower limb was raised from the bed by the examiner, when the left limb fell back to the bed (sign of Grasset and Gaussel). This did not occur when the procedure was reversed. The child pressed less with the left heel against the bed when she raised the right lower limb than she pressed with the right heel when she raised the left lower limb (sign of Hoover). When the right lower limb was placed in abduction and the child attempted to bring it toward the other against resistance, the left lower limb showed movement of adduction; this did not occur when the test was reversed (sign of Raimiste). The left patellar reflex was exaggerated.

Rabies. Symptoms of a lesion of the spinal cord following the anti-toxin treatment for rabies are rare, but occasionally a case is reported. Thus, Lefas² had a patient who after thirteen injections developed rapidly pain and weakness, and these symptoms became very severe after another injection was given, and within a short time the Brown-Séquard symptom-complex was established. Improvement occurred slowly.

Dysbasia Lordotica Progressiva, Dystonia Musculorum Deformans. Under this designation Oppenheim³ described a group of cases that

¹ Revue Neurologique, March 30, 1912, p. 434.

² Ibid., September 30, 1911, p. 370.

³ Neurologisches Centralblatt, October 1, 1911, p. 1090.

are difficult to classify. Children between eight and fourteen years of age are affected, females as frequently as males, but so far only those of the Jewish race. The symptoms develop slowly, occasionally first in the lower limbs, but more frequently in the upper, and then the lower limbs soon become affected and more severely than the upper, and the muscles of the thighs, pelvis, and back become the chief seat of the disorder. It is a peculiar form of *astasia-abasia*. The symptoms are comparatively slight when the patient is in the dorsal position; but in standing and walking marked *lordosis* or *lordoscoliosis* of the lower thoracic and lumbar vertebrae occurs, with prominence of the buttocks. The more severely affected lower limb is usually flexed at the hip and knee in standing, or the patient places his weight chiefly on one limb, with inward or outward rotation of the limb. The gait is extraordinary, and suggests *hysteria*. The position described above becomes aggravated, so that the gait is clownish, and the child perspires freely, gets red in the face, and has a more rapid pulse. In the upper limbs, a combination of tremor and spasm interferes with writing.

There is no true *athetosis*. When the patient is at rest, the limbs are quiet, except that occasionally a tremor of short duration develops. Some muscles are in slightly exaggerated *tonicity*, and yet in the lower limbs the condition is one of *hypotonicity*. The disorder is not *hysteria*, and is probably organic.

Lumbar Type of Intermittent Claudication. Under this designation J. Ramsay Hunt¹ describes a condition of intermittent claudication of the muscles in the lower part of the back. His patient, a man, did not experience the slightest discomfort while in bed or when sitting. Walking or long-continued standing alone brought on pain, which was deep seated and very intense, and was always relieved by support of the spine, which removed the strain from the affected muscles. The condition had persisted for two years, gradually growing worse in spite of treatment. The spine was perfectly mobile and the painful area was not tender on pressure.

Hunt attributed the symptoms to disease of one or more of the lumbar arteries or to an arteriosclerotic process in the abdominal aorta, which interfered with the free flow of blood through these vessels, so that a sufficient blood supply was received for the physiological processes in the passive state, but did not suffice for the increased demands of the sacrolumbar mass during activity, hence the painful cramp and its peculiar intermittent character. Hunt thinks that some of the lumbar pains and cramps of advanced life may be dependent upon arteriosclerotic processes in the abdominal aorta or its lumbar branches.

¹ American Journal of the Medical Sciences, February, 1912, p. 173.

Imperative Pains. The pains which Fry¹ considers under this title frequently are very difficult to treat, and are without organic basis. He regards them as having the imperative features of an obsession. They occur with such severity that the advisability of operation may be considered. Fry gives several examples of these pains, and every neurologist can probably recall cases that have occurred in his own experience.

¹ *Journal of Nervous and Mental Disease*, November, 1911, p. 671.

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